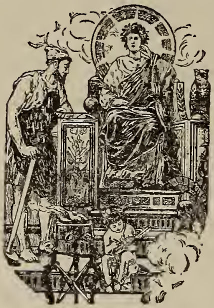
554

SCIENTIFIC LIBRARY



UNITED STATES PATENT OFFICE

GPO 16—53001-1

THE

AMERICAN JOURNAL OF PHARMACY.

PUBLISHED BY AUTHORITY OF THE

PHILADELPHIA COLLEGE OF PHARMACY.

EDITED BY

JOHN M. MAISCH.

PUBLISHING COMMITTEE FOR 1889:

HENRY N. RITTENHOUSE, CHARLES BULLOCK,
JAMES T. SHINN, THOMAS S. WIEGAND
AND THE EDITOR.

VOLUME LXI.

FOURTH SERIES, VOLUME XIX.

58,709.

PHILADELPHIA:
1889.

RS1
.A45 .A5

THE AMERICAN
JOURNAL OF PHARMACY.

JANUARY, 1889.

THE HUNGARIAN DAISY AS AN ADULTERANT OF INSECT POWDER.

By G. M. Beringer, A. M., Ph.G.

Read at the Pharmaceutical Meeting, December 18th.

A short time ago, there was received in New York a consignment, consisting of a number of bales of these Hungarian Daisies. They were entered at the Custom House as insect flowers and were evidently intended as a sophistication of the Dalmatian Insect Powder. In the course of business, a sample of these flowers was submitted to the writer.

The similarity in size and general appearance to the flowers of the Dalmatian powder, would easily deceive the careless or unguarded observer. On close inspection, however, with a microscope of ordinary powers, the differences in the botanical structure are such as to render the distinction between the whole flowers comparatively easy. But as they will, probably, in future importations, be mixed with the genuine, which, usually, as imported in bales, are very much broken up, they will prove a dangerous adulterant, one difficult to determine, and if in the powdered article most likely beyond detection.

The Dalmatian Insect Powder has proven so superior to the Persian powder, that it has driven the latter almost entirely out of the market. It is said to be the most valuable product of Dalmatia and is now imported in very large quantities. As imported, it is usually adulterated with the ground stems and leaves of the plant. The latter being cut down at the end of the season, dried, ground and mixed with the ground flowers in the proportion of one to three or four of the flowers. This accounts for the fact, that the whole flowers are usually quoted at the same price and frequently at an advance on the price of the powder. The adulteration of this product with Hungarian Daisy, is deemed of such importance as to be worthy of record and prompt exposure.

The present editions of the Dispensatories contain but indifferent descriptions of this drug. The following descriptions are offered with the hope that they may serve to distinguish the two.

Hungarian Daisy.—Stems angled, the dried flower heads averaging about half inch in diameter, the rays florets being twisted and folded. When soaked in water to their natural size, the flower heads average 1¼ inch in diameter from tip to tip of the ray florets. The involucre broadly campanulate imbricate, the scaly margins chaff-like, the stem being deeply inserted makes it distinctly depressed or concave; greenish-grey in color, glabrous. (Fig. 1 represents the involucre, the dried flower enlarged two diameters.)

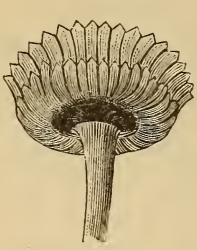


FIG. 1.

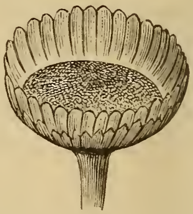


FIG. 2.

Receptacle prominent, subglobular, convex, dark colored. (Fig. 2. represents the receptacle, (the florets being removed) enlarged two diameters.

The ray florets, (about 18), white ligulate, nerved, three toothed pistillate; the appendages of the style extending beyond the tube. The achenia angled without pappus, but crowned with a faint margin. (Fig. 3 A represents the ray floret enlarged about three diameters.) The disk florets numerous, bright orange yellow, tubular, five toothed, the stamens included; achenia without pappus. (Fig. 3 B represents the disk floret enlarged about seven diameters.)

The botanical characteristics of this flower would indicate that it most probably belongs to the sub-genus Leucanthemum; but, with only the flowers for examination, the naming of the species would be but a guess of little or no value.

Chrysanthemum cinerariæfolium, *Bocc.* (Pyrethrum cinerariæfolium, *Treviranus*)—*Dalmatian Insect Flower.* Stem angled, the whole flower head ashy gray in color and quite pubescent. When dried the flower heads are from $\frac{1}{4}$ to $\frac{3}{8}$ inch in diameter, the ray florets being twisted and folded and frequently broken off. When soaked to the natural size, about $1\frac{1}{4}$ inch in diameter, including the ray florets. The involucre imbricate, the scaly margins membranous, campanulate and convex without depression at place of attachment to stem. Fig. 4 represents the dried involucre enlarged two diameters. The receptacle small, conical, naked and solid and light greenish-gray in color. (Fig. 5 represents the receptacle of the dried flower, the florets being removed, enlarged two diameters.) The ray florets, (about 18) white, ligulate, nerved, three toothed, the tube pubescent, pistillate; the appendages of the style protruding beyond the short tube. The achenia crowned with a membranous, notched (eroded) pappus. (Fig. 6 A represents the ray floret enlarged about 3 diameters). The disk florets, numerous gray tending towards light yellow in color, tubular, five toothed, the stamens included. The achenia angled, nearly as long as the tube and also crowned with a notched pappus. (Fig. 6 B represents the disk floret

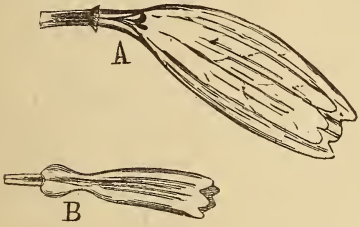


Fig. 3.

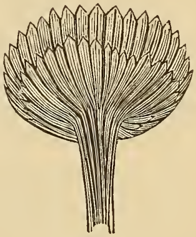


Fig. 4.

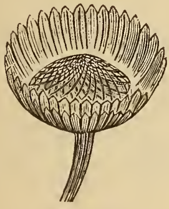


Fig. 5.

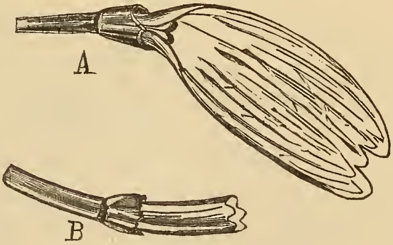


Fig. 6.

enlarged about four diameters.) The florets of the true insect powder are somewhat larger than those of the Hungarian Daisy.

The Hungarian Daisy is distinguished from the true Pyrethrum by the orange yellow disk florets, by the depression of the involucre, by its prominent dark receptacle and the absence of pubescence and pappus. The odor is less pungent than that of the true insect flower being more like that of matricaria. The difference in odor is more pronounced on infusing in warm water. The Hungarian Daisy yields a powder, somewhat darker in color. This powder used upon flies and cockroaches appeared to have no value as an insecticide. Microscopically no difference could be detected between the two powders.

Time and the amount of material at my command would not permit of a thorough chemical examination, but it was hoped that the percentage of extractive matter obtained with various solvents might furnish a useful comparison. The following statement exhibits the results obtained.

	Chrysanthemum cinerariæfolium.		Hungarian Daisy.	
Petroleum Ether,	2·49	per cent.	3·37	per cent.
Ether,	2 85	"	2·68	"
Alcohol,	6·57	"	9.45	"
Water,	16·70	"	13·43	"
Ash,	6·50	"	9·30	"

SOME INDIAN FOOD PLANTS.

II. LEWISIA REDIVIVA, *Pursh.*

By Henry Trimble.

A Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

Read at the Pharmaceutical Meeting, December 18th.

The following description of the above plant, together with the material for analysis, has been furnished by Dr. V. Havard, U. S. Army Surgeon, at Fort Abraham Lincoln, Dakota:

"Lewisia rediviva, called "Spathum" by the natives of Northern California and South Oregon, and "Chita" by those of Northern Oregon. The "bitter root" of the whites in the Rocky Mountain region.

"This interesting member of the Purslane family (Portulacaceæ) named after the great explorer, Capt. Lewis, who, with Capt. Clarke, first crossed the Rocky Mountains in 1805, owes its specific designation to its wonderful vitality; prepared specimens have been found, after months and years, sprouting in herbariums, and have, even then, been planted successfully.

"It is a small stemless herb with linear leaves, smooth and fleshy, densely imbricated on the short, thick caudex. From the cluster of leaves spring one or more jointed scapes, one or two inches long, each bearing a showy flower. Sepals 6–8, light pink, broadly ovate, membranous, persistent. Petals 8–10, rose colored, oblong, often an inch long, at length twisting around the stamens and pistil. Stamens numerous. Capsule globose, 1-celled, separating transversely at the base, containing many campylotropous shining seeds borne on long funiculi which spring from a central placenta.

"This plant blossoms early in May and through June and part of July. After the middle of July (according to Dr. C. C. Parry) the scape breaks off at the joint and the flower is blown away, leaving no trace of the plant exposed to view until the following spring develops the cluster of leaves by which the Indians are guided in procuring their supplies of this palatable and nutritious root.

"It is common, often abundant in the Rocky mountains and westward to the Pacific, on dry prairies and in mountain valleys. Its vast habitat comprises the southern part of Washington territory, Oregon, Idaho, Western Montana (where it gives its name to the Bitter Root Mountains), Northern California, Nevada, Utah, Western Wyoming and Northern Arizona.

"The natives use the roots as an article of food. These roots, 3 or 4, or more, curled and twisted, spread out laterally and are generally superficial. As they spring from the caudex they are rarely half an inch in diameter and are seldom thicker than a goose quill; they taper gradually to a length of two to four inches when they branch off into small radicles. The bark is brownish externally, bright red within and very bitter, it is quite possible that it might possess useful tonic and astringent properties. The inner part of the root is white and farinaceous, containing in the centre the yellowish pith. This white part is quite palatable and said to be very nutritious, a single ounce of the dried article (according to Dr. E. Palmer) being sufficient for a meal. Eaten raw it has a slight bitterish flavor. According to Nuttall, it almost dissolves into starch by maceration in cold water. If boiled in water, it forms a substance similar to boiled arrow-root. The Indians, generally, boil it with other esculents into a soup.

"As a very pretty ornamental plant, the Bitter Root would prove quite an acquisition to our gardens."

The roots of the above plant as received by me were free from bark, of a white color, and ready for use as food. No evidence of sugar as glucose or saccharose could be obtained. Tests for tannin likewise gave negative results. The most important constituents are starch, gum and mucilage, the last two are not readily precipitated by alcohol. The following summary gives the amount of the most important food constituents.

Fat, resin and wax	4·98
Gum and mucilage	14·80
Albumenoids	3·58
Starch	8·57
Moisture	12·17
Ash	2·53
Woody fibre and undetermined	53·37
	100·00

The amount of starch found may appear small when we consider the uses of the root, but the large amount of gum and mucilage make up for this deficiency.

THE LEAVES OF MAGNOLIA GLAUCA, LINNÉ.

By Wilbur Fisk Rawlins, Ph. G.

Abstract from a Thesis.

The leaves are three to six inches long, one and a half to two inches in width, have a prominent mid-rib, are pinnately veined, elliptical, petiolate, coriaceous, deep green upon the upper side and of a beautiful glaucous color underneath. Twenty pounds were collected in the early part of September. After drying they weighed eight pounds, the loss being sixty per cent. They were then reduced to a number eighty powder.

Two grams of the drug heated in an air-bath at a temperature of 110° C. lost ten per cent., and when incinerated left 10 per cent. of ash.

Fifty grams of the powdered leaves were placed in a flask, covered with petroleum spirit and, after maceration, exhausted; five per cent. of the drug was soluble in petroleum. This residue when heated to 110° C. lost four-tenths per cent. Absolute alcohol left four-tenths of one per cent. of insoluble waxy matter melting at 64° C.

The drug was then treated with stronger ether, which dissolved four per cent. The dry extract was treated with boiling distilled water and lost three-tenths of one per cent. It gave a bitter taste to the water, but yielded no precipitate to tests for alkaloids. On evaporating the ether there were formed some fine needle-shaped crystals. The extract was dissolved in alcohol, the chlorophyll removed by animal charcoal, and several attempts were made to obtain the crystals in a purer state, but without success. There was, however, a resin present that had a tendency to crystallize.

Absolute alcohol was the next menstruum used, and the extract obtained was five per cent. of the drug. About one and a half per cent. was soluble in water. The portion that did not dissolve in water was a greenish-yellow powder and had a lasting unpleasant taste. Tannin was found in the soluble portion, but the percentage was not determined. The aqueous solution was made acid and agitated successively with petroleum, benzol and chloroform. It was then made alkaline and the same treatment repeated. The resulting liquids were evaporated, but nothing found in the petroleum or benzol. There was a deposit of crystals, however, from both the acid and alkaline liquid with chloroform. Nothing else of importance was found in the alcoholic extract.

The residue, after exhaustion with alcohol, was macerated with water, which dissolved thirteen per cent. of the drug, containing mucilage, coloring matter and ash, but no sugar, nor anything else of special importance.

The residue insoluble in water yielded to solution of caustic soda mucilaginous substances and albuminoids amounting to four per cent.

Diluted hydrochloric acid dissolved two per cent. of the drug, and of this six-tenths of one per cent. was oxalate of calcium. No starch was found.

On treatment with chlorine water the loss was six per cent. lignin; and with chlorate of potassium and nitric acid the loss was two per cent.

Three pounds of the fresh drug were distilled with water. From the distillate, by shaking with ether, was obtained a volatile oil of a bright green color with a penetrating odor, resembling that of fennel or anise, but more pleasant. The yield was very small, about one drachm being obtained from the three pounds. While the solution of oil in the ether was filtering the rapid evaporation of the ether caused crystals to form on the edge of the filter, but they soon volatilized and no examination was made of them.

In order to determine the nature of the crystals formed by the use of chloroform from the aqueous solution of the alcoholic extract, one pound of the original drug was packed in a percolator and exhausted with wood alcohol; the alcohol was recovered by distillation and distilled water added to the residue; the solution was filtered and agitated with chloroform, but crystals were not obtained. These extracts had a bitter taste, imparted fluorescence to the chloroform solution and after boiling with acid, reduced Fehling's solution. The principle seems to differ from the magnolin of Mr. Procter.

Note by the Editor.—It does not appear to be generally known that the fresh leaves of Magnolia glauca may be used in the place of indelible ink for the marking of linen and other fabrics, by placing upon the latter the lower surface of a leaf, and tracing upon the upper surface with a blunt peg, using some pressure, the desired characters. The writing appears upon the fabric at first of a grayish green color, which gradually becomes darker, and does not disappear on washing.

METHYSTICIN FROM PIPER METHYSTICUM.

By Robert Glenk.

On evaporating an alcoholic tincture of the root to a small bulk, a crystalline precipitate forms, which is obtained snow-white on dissolving in boiling water (to separate resin) and allowing to cool. This principle is the methysticin first observed by Morton, in 1844, and further examined, in 1860, by Cuzent, Gobley and O'Rorke. Crystallized from alcohol, it forms fine needles, which are odorless and tasteless, and freely soluble in ether, benzol and benzin; very soluble in boiling alcohol, slightly soluble in the cold; soluble in about 60 parts of boiling water, but sparingly soluble in the cold, separating as a crystalline feathery precipitate. Its solution in hot water is of a neutral reaction, and is not precipitated by alkaloidal reagents.

When placed in a test tube kept in mercury, the principle melts at 133°C; by heating on platinum foil it burns with a smoky flame, and is finally consumed without residue. It does not reduce an alkaline solution of copper.

Concentrated sulphuric acid forms immediately an intense carmine color, which changes to a brown in one or two hours. Concentrated nitric acid dissolves it with a reddish-brown color. Concentrated hydrochloric acid gives an orange red color.

With oxidizing agents, like permanganate of potassium, chromic acid ($K_2Cr_2O_7+H_2SO_4$), or nitric acid, it is decomposed, with the production of a strong heliotropin-like odor, which is quite characteristic, being produced even in very dilute solutions. A cold solution of methysticin in diluted alcohol, on being boiled for a few seconds with dilute nitric acid, gives a decided odor of heliotrope. This does not occur with other oxidizing agents in such dilute solutions.

The color, with concentrated sulphuric acid, is also quite characteristic, a bright carmine red being produced, in rather dilute solutions, on adding to four or five drops of the latter about ten drops of the acid.

ANALYTICAL NOTES.

Abstracts from Theses.

Gallic acid.—Specimens of gallic acid from different manufacturers were procured by Fred. Wm. Meissner, Jr., Ph. G., and subjected to the pharmacopœial tests. The saturated aqueous solutions yielded no precipitates with an alkaloidal salt, albumen or gelatinized starch, but produced heavy white precipitates with a solution of tartar emetic and ammonium chloride. Even in very dilute solutions of gallic acid a distinct precipitate was obtained by this test, and previous continued washing with cold water did not prevent the precipitation. Gallic acid was then prepared by Liebig's process from tannin by boiling with sulphuric acid, recrystallizing and decolorizing with animal charcoal, remaining traces of tannin being removed by solution of lead acetate, as suggested by Watt. The crystals thus obtained answered all the pharmacopœial requirements; the result may, perhaps, have been caused by the presence of a slight amount of acetic acid. The albumen and alkaloid tests are regarded as sufficiently delicate for the detection of tannin in gallic acid, one part in thirty being easily indicated.

Five samples of gallic acid on being heated to 100° C. lost respectively 9·5, 9·6 9·75, 9·75 and 10·5 per cent. of water.

Granular salts of caffeine.—William Kuder, Ph. G., procured a sample of crystallized citrate of caffeine, which was of neutral reaction, and volatilized completely when heated on platinum foil. A solution of 0·50 gm. of this sample in distilled water was made alkaline with sodium hydrate, repeatedly agitated with chloroform, the chloroform solution evaporated spontaneously, and the crystals thoroughly dried; the weight of caffeine was 0·427 gm., corresponding to 0·466 gm. of crystallized alkaloid. Citric acid was absent.

Some of the commercial granular effervescing salts were examined in the same manner, except that one or two gm. was used for each assay, which gave for—

I.	1·9	per ct. dry alkaloid, corresponding to	2·061	per ct. crystallized alkaloid
II.	4·84	" " "	5·28	" "
III.	1·5	" " "	1·628	" "

Nos. I. and II. were granular citrates; No. III. contained bromides.

Assays of Milk.—The standard for pure milk, adopted in different localities, is given by Albert James Lynch, Ph. G., as follows:

	France.	England.	N. York.	N. Jersey.	Mass.
Fat	2·70	2·50	3·0	3·0	3·65
Other solids	8·80	9·0	9·0	9·0	9·35
Total solids	11·50	11·50	12·0	12·0	13·00

During the winter of 1887–88, the author examined a number of samples of milk procured in the Philadelphia market, with the following results:

	I.	II.	III.	IV.	V.	VI.	VII.	VIII.
Fat	5·21	3·63	2·61	2·70	3·51	2.65	5·04	3·75
Other solids	15·60	9·26	9·01	9·22	9·08	9·18	10·46	9·21
Total solids	20·81	12·89	11·62	11.92	12·59	11·88	15·50	12·96

No. I. was Alderney milk; the solids consisted of fat 5·21, sugar 4·20, casein and albumen 5·69, ash 0·71. No. VII. was also sold as Alderney milk.

An analysis of a so-called catarrh cure was made by Otto Prochaska, Ph. G. One of the powders was white, the other of a pink color; the coloring matter was not taken up by alcohol, but was dissolved by ammonia, with an intense red color, which was destroyed by hydrochloric acid. In other respects the two powders showed no difference. They had an alkaline reaction, on ignition lost 28 per cent. without charring, yielded nothing to ether or chloroform, and in aqueous solution, to which ammonium chloride had been added, gave, with ammonium sulphide, a slight black precipitate, and the filtrate a slight white precipitate with ammonium phosphate. Sodium was the remaining base found, and besides carbonic, no other acid could be detected. The powders consist of commercial sodium bicarbonate, one of them being colored with a little carmine.

An analysis of a so-called invisible toilet powder was made by Owen C. Spear, Ph. G. Ether dissolved the volatile oil, and on evaporation left a trifling amount of fatty matter. When ignited the odor of burning sugar was given off. Cold water took up nothing; on boiling with water and cooling a gelatinous liquid was formed, which turned blue with iodine. After exhausting with boiling water, the residuary powder did not blacken when ignited; hydrochloric acid dissolved a portion of this residue, containing Zn and a little Fe, Al and Ca, but no other metals. The undissolved powder was ignited with Na_2CO_3, then treated with water and HCl, when the presence of silica and magnesia, with traces of Fe and Al was shown. The toilet powder proved to be a mixture of starch, talc, zinc oxide and calcium carbonate.

For quantative analysis the powder was ignited and the starch estimated by the loss. Treatment of the residue with HCl left the talc undissolved; the solution treated with ammonia yielded a precipitate, which after ignition was weighed as Fe_2O_3 and Al_2O_3. From the ammoniacal filtrate the zinc was precipitated by NH_4HS, converted into chloride, precipitated as carbonate, and weighed as oxide. The lime was precipitated from the mother liquor, and weighed as carbonate. The analytical results were:

Starch	18·02
Talc	49·42
Alumina and ferric oxide	1·37
Zinc oxide	29·76
Calcium carbonate	1·43
	100·00

The toilet powder was probably made by mixing together commercial starch 18, talc 52, and zinc oxide 30 parts.

To remove hiccough, Dr. Böttrich (*Therap. Monatsh.*, June, 1888,) has found the best proceeding, to take a very deep inspiration and hold the breath as long as possible. If the breath be kept just past a rising singultus, the latter generally ceases.

ANALYSIS OF MARKET JELLIES.

By Lysander Mann Jones, Ph. G.

From an Inaugural Essay.

It has been asserted that the jellies found in the market are not pure fruit jellies as represented and that they are principally composed of gelatin and glycerin. Although my analysis has proved that they are fruit jellies, at least some of them are not made from the fruit which they are supposed to represent, but are made from some cheaper fruit artificially colored and flavored.

Taking as a standard a currant jelly known to be pure and homemade, I have analyzed six different jellies purchased in the market, namely: apple, currant, cranberry, grape, pineapple and raspberry and compared these with the genuine. Of these I found the grape to be the only genuine and made from the fruit represented. The commercial ones differ considerably in color and taste from the genuine; the genuine being of a deep red color and having a very pleasant, sweet, fruity and acidulous taste while the commercial present a much nicer appearance being of a bright red color and more transparent, but have a flat, ropy and but slightly acidulous taste and are not as soluble.

The standard jelly was composed of 26 per cent. water, 36.5 per cent. glucose, 32.5 per cent. saccharose and 1.3 per cent. pectin. The remaining 3.7 per cent. consists of insoluble matter, malic and tartaric acids. The pectin was gotten by adding alcohol to a given weight of jelly in a concentrated aqueous solution, collecting the precipitate on a filter, drying and weighing. The ash of 2 grams amounted to 5 milligrams or .25 per cent.

The commercial currant jelly I found to be composed of 45 per cent. water, 18.46 per cent. glucose, 13.84 per cent. saccharose and .7 pectin. The remaining 22 per cent. consists of insoluble matter, tartaric acid, artificial coloring matter, etc. The ash of 5 grams amounted to 17 milligrams, or .34 per cent.

The genuine had a strong acid reaction, while the commercial jellies had but a faint acid reaction with the exception of the grape.

On evaporating an aqueous solution of the market jellies an odor was given off resembling baked apples, thus proving the source from which they are made. The absence of gelatin was proven by no precipitate forming on the addition of tannin, while the presence of pectin as the base was proven by means of a solution of sub-acetate of lead.

The principal adulterant found in the market jellies, except in the the grape, was the artificial coloring. On making an aqueous solution of about 5 grams, evaporating this to the consistency of a syrup and to this adding about 100 cc. of alcohol and warming slightly, the pectin would be precipitated and the coloring matter taken up in the alcohol. This was filtered and to the filtrate was added small pieces of raw silk and wool and boiled for some fifteen minutes. The result was the silk and wool took up the coloring and were dyed of a light red color. The coloring in the genuine would not act in this way.

In testing the genuine jelly for pectin with solution of sub-acetate of lead, the coloring matter was precipitated with the pectin, while in the commercial jellies it remained in the solution, the pectin being separated as a light flesh colored precipitate.

The market jellies in solution did not present a perfectly clear liquid, but on the addition of ammonia water the color deepened considerably and the solution became much clearer.

Glycerin was not present in the jellies. This was shown by precipitating the pectin with alcohol, filtering, evaporating nearly to dryness, treating this residue with one part ether and two parts alcohol, filtering, evaporating to dryness and testing this with the borax bead. Metals were absent with the exception of a little iron.

EXAMINATION OF CHLORINATED LIME.

By Hermann M. Schrœter, Ph. G.

A Contribution from Chemical Laboratory of the Philadelphia College of Pharmacy.

Read at the Pharmaceutical Meeting, December 18th.

Chlorinated lime as a commercial product is variable in composition. It is therefore valued by the percentage of available chlorine which it contains. The Pharmacopœia requires at least 25 per cent. of such available chlorine. The following examination of this article will show the average value of same as found in the market, both in bulk and in packages. That in ready put-up packages is generally contained in pasteboard boxes, the insides of which are coated with resin, or else in sealed tin cases. Small and large packages were procured, as also several samples in bulk, of which 18 kinds were examined. The method used was that recommended by the Pharmacopœia or the modification of Bunsen's iodometric method. It consists in determining volumetrically by titration with sodium thio-sulphate, the amount of iodine which is liberated in an aqueous solution of chlorinated lime when potassium iodide and hydrochloric acid are added in excess. The Pharmacopœia directs 0·71 gm. of chlorinated lime mixed with a solution of 1·25 gms. of potassium iodide in water and 9 gms. of dilute hydrochloric acid added, should require not less than 50 cc. of the volumetric solution of sodium hyposulphite. This corresponds to 24·93 per cent. of chlorine. The following figures give the mean percentages of chlorine of several determinations of each sample:

1.	25·73 per cent.	7.	31·11 per cent.	13.	29·17 per cent.
2.	37· "	8.	25·73 "	14.	31·16 "
3.	35·75 "	9.	25·83 "	15.	30·76 "
4.	31·91 "	10.	22·63 "	16.	30·91 "
5.	24·33 "	11.	24·53 "	17.	27·92 "
6.	37·84 "	12.	28·17 "	18.	36·46 "

Nos. 1, 2, 3, 4, 14, 15, 16 and 17 were obtained in bulk. Nos. 6 and 12 were 1℔ packages and the balance were smaller parcels. The above figures give an average percentage of 29·83 per cent. of chlorine, showing the superior strength of the commercial article. From 1℔. packages determinations were made severally from different parts of the parcels, the difference in results being only slight.

PERMANENT SYRUP OF HYDRIODIC ACID.

By Joseph W. England, Ph. G.

Read before the Pharmaceutical Meeting, December 18th.

Hydriodic acid as a remedial agent first came into vogue some thirty years ago through Dr. Buchanan, who strongly urged its use as an alterative. Since its introduction it has found a limited and varying demand amongst the medical profession.

There seems to be good grounds for believing that its failure to meet popular favor may have largely been due to the fact that the solution is exceedingly unstable, unless well protected by sugar and kept in close-stoppered vials. Even then it has been a most unsatisfactory preparation, pharmaceutically, tending readily to decomposition, on exposure to air, into free iodine and water, the former of which, by its presence, rendered it a local irritant instead of an alterative.

Of late, however, there seems to be a tendency to return to its use, especially as there are now obtainable in the markets a number of syrups of hydriodic acid claimed to be unalterable on exposure to air.

Various preservative substances are used to achieve this end, such as honey, potassium hypophosphite and hypophosphorous acid; glycerin has little or no influence in retarding decomposition.

The new National Formulary (p. 122) gives a formula for the preparation of a colorless hydriodic acid syrup, prepared by double decomposition between potassium iodide and tartaric acid in the original way, but preserving it from oxidation with potassium hypo-phosphite.

This formula, in its practical workings, is most excellent and, in the writer's opinion, superior to the pharmacopœial process of iodine and sulphuretted hydrogen. There is one point in it, however, upon which criticism might be turned and that is the presence of the potassium hypophosphite, or, what is more probable, hypophosphorous acid, since some acid tartrate of potassium still remains in the finished solution unprecipitated, but the quantity of this salt used, is so small that this feature, practically, need not be regarded.

The writer has used this formula since last August, with but one modification in detail, and that was the substitution of syrupy glucose for potassium hypophosphite, as the preservative. A sample of some made last August is as clear and destitute of free iodine as some made yesterday. The modified formula is as follows:

Iodide of Potassium	123	grains.
Tartaric Acid	112	"
Water	½	fluidounce.
Diluted Alcohol	1	"
Syrupy Glucose	¼	"
Syrup, enough to make	16	"

Dissolve the iodide of potassium in one-half (½) fluidounce of water and the tartaric acid in one-half fluidounce of diluted alcohol. Mix the two solutions in a vial, cork and shake it well, and then place it in ice-water for about half an hour; again shake it thoroughly, and then pour the mixture upon a small white filter, and filter into a bottle containing 13¾ fluidounces of syrup and one-fourth (¼) fluidounce of syrupy glucose. When the liquid has run through, wash the vial and filter with one-half (½) fluidounce of diluted alcohol, added in several portions. Then add enough syrup to make sixteen (16) fluidounces.

The product is a clear, transparent, almost colorless liquid, odorless, having a pleasant acidulous taste, and evincing no free iodine, on the addition ot cold gelatinized starch. It remains unchanged on exposure to air. Syrupy glucose is used in place of the solid compound, because it is more convenient and fulfils the same purpose. One peculiarity noticeable with its use is the fact that syrups of hydriodic acid made with it, and containing, at first, free iodine, from faulty manipulation, become, on standing for a day or two, colorless from the conversion of the free iodine, by the glucose, into hydriodic acid.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the AMERICAN JOURNAL OF PHARMACY.

RHAMNUS FRANGULA IN ODONTALGIA.—Dr. Gretchinsky writes to the *Revista de Med. y Farm.*, that he makes a decoction by boiling 15 to 30 gm. of the bark in 2 tumblers of water. Patients are directed to rinse the mouth with this every five minutes until the pain ceases; and then every two hours. Cavities may be filled with cotton dipped in the tincture.—*Répert. de Ph.*, November.

PAPAYOTIN IN FISSURE OF THE TONGUE.—Schwimmer is said to have used this substance successfully in cases which had resisted the action of chromic acid, iodoform and nitrate of silver. He employed the following formula: Papayotin, 1 to 2 parts; glycerin and distilled water, of each 10 parts. Five or six applications should be made daily, after drying the fissures.

BENZOINATED GRAY OIL.—Beausse places 20 gm. of mercury in a matrass and adds 5 or 6 gm. of ethereal tincture of benzoin, with brisk agitation. When the globules are no longer visible the tincture is decanted and the vessel re-corked and again agitated. The mercury forms a soft paste on the sides of the vessel. All the material is then put in a mortar with 10 gm. of vaselin and 30 of liquid vaselin and well triturated, adding also the washings of the matrass with ether. "The preparation requires a labor of four or five hours."—*Arch. de Ph.*, Nov. 5.

NAPHTHOL OINTMENT.—Used for skin diseases, this ointment should contain, according to Dr. Lassar, about 10 per cent. of naphthol, to which—in obstinate cases—10 per cent. of camphor may be added. The naphthol ointment may remain in contact with the skin from one-half to one hour; the camphorated compound must be removed within about 15 minutes.—*Arch. Méd. Belg.; Monit. Th.*, Nov. 5.

Preparations of Sozoiodol.—A 5 to 10 per cent. solution retards the development of pyogenous cocci; 10 per cent. solutions prevent the development of microbes; 20 per cent. solutions render gelatin sterile. In doses of 1 gm. sozoiodol is not toxic to rabbits. For open wounds, 2 or 3 per cent. solutions of the acid (diiodoparaphenolsulphonic) with the salts of sodium or aluminium is used. For a prolonged action the sozoiodol of potassium is mixed dry with powdered talc or milk sugar in quantities of 5 to 10 per cent. For ointments, sozoiodol of potassium, sodium, aluminium or lead may be used in the proportions of 5 to 10 per cent., with lanolin. For insufflations, the sodic or potassic salt is mixed with sugar of milk. The same is true of the zinc salt which may contain 1 to 10 per cent.; and the mercury salt, which should be made with 5 to 10 of the latter to 90 or 95 of sugar of milk.—*Nouv. Rem.*, Nov. 24.

Unna's Topical Applications in Skin Diseases.—Dr. Hallopeau in a recent visit to Unna, learned that he has been engaged in perfecting these applications, which are recommended in three forms: medicated paste; ointments spread upon muslin, and plasters similarly prepared. The paste, used as a vehicle, prolongs the action of the medicaments, retains the secreted water upon the surface of the skin, augments cutaneous respiration and quiets irritation. The applications are intended for prolonged use without re-dressing. The *soft paste* of Unna is made as follows: Oxide of zinc, 15; glycerin, 15; gelatin, 25; water, 25. The muslin plasters are prepared by making the fabric impermeable with caoutchouc dissolved in benzol or the oleate of aluminium. M. Vigier in recent experiments on the preparation of the plasters gives the preference to a coating of soft paraffin mixed with gutta-percha dissolved in bisulphide of carbon. Unna's paste, spread on these plasters, or used as an ointment, is said to "render great service in the treatment of pruritus, eczema, intertrigo and acné."—R. Blondel, *J. de Ph. et de Ch.*, Dec. 1.

Vermillonette.—In an aqueous solution of eosine, minium is placed in suspension and briskly agitated, while adding a solution of acetate or nitrate of lead until the color is wholly precipitated. Wash, press and bolt. The color is very brilliant, but, like all eosine colors, it fades under the influence of light.—*Monit. sci.*; *J. de Ph. et de Ch.*, Nov. 1.

TOXIC POWER OF STROPHANTIN. Prof. Sée in a communication to the Academy of Medicine (Nov. 13), said that the strophantus plant or its extracts only, should be used in medicine; strophantin, he said, had so high a toxicity that it "must not be employed clinically." At the same meeting, Dr. Dujardin-Beaumetz also recommended that strophantin be prescribed in no case, "as the quantity of strophantidin contained in it must, for the present, be more or less conjectural." [The samples of strophantin which seem to have frightened the Paris faculty are said (*Un. Méd.*, Nov. 15), to have been made by M. Arnaud, chief of M. Chevreul's laboratory.]

INCOMPATIBILITY OF COCAINE AND BORATE OF SODIUM. In a paper to the *Société de Pharmacie*, M. Levaillant said that in mixing these substances for collyria or gargarisma he had found a precipitate of cocaine. This will disappear on the addition of a few drops of glycerin. *Arch. de Ph.*, Nov. 5.

REACTION OF PHENACETINE.—Chlorinated water gives the aqueous solution a red-violet color which soon passes to ruby red. A solution of chloride of lime will give the same reaction.—*Arch. de Ph.* Dec. 5.

ESCHSCHOLTZIA CALIFORNICA.—According to a recent examination of this plant by M. Bardet, (*J. de Ph. et de Ch.*, Dec. 1), its narcotic power is weak; doses of 10 to 12 gm. of the extract were necessary to kill a rabbit. In seeking the active principle, the author took up the extract with acidulated water and treated it with ammonia, which gave a viscous product capable of reducing iodic acid, a violet precipitate with molybdate of sodium, and an orange color with nitric acid; briefly, it offered the reactions of morphine. This is the first time, so he believes, that morphine has been obtained from plants other than papaver[1]. After extracting the morphine, another substance remained which gave a yellow precipitate with phospho-molybdate. It appeared to be a glucoside. M. Bardet is now studying it.

---

[1] That Walz found in Eschscholtzia in 1844 sanguinarine and two other alkaloids was mentioned in *Amer. Journ. Phar.*, 1887, p. 296. Charbonnier obtained a little morphine from the leaves and capsules of Argemone mexicana in 1868; see *Jour. de Phar. et de Chim.*, 4 ser., vii, p. 348–358.—EDITOR OF AMER. JOUR. PHAR.

REACTIONS OF CERTAIN ALKALOIDS WITH FLUONIOBATE OF POTASSIUM AND CHLORINE IN SULPHURIC ACID.—The fluoniobate reagent is prepared by dissolving 1 gm. of the salt in 40 ccm. of concentrated sulphuric acid, and then heating to drive off the hydrofluoric acid. With apomorphine, this solution gives a very intense red, slightly brownish, which becomes of an ochre yellow color on adding water. Morphine acts in the same manner, but the coloration is weaker. The chlorine reagent is easily prepared by saturating concentrated sulphuric with pure, dry chlorine. With this, narcotine gives a very beautiful violet coloration, which passes rapidly to wine-red and yellow; heated slightly, the mixture becomes red. Narceine turns of an olive green color which turns gradually blue, with streaks of red. Brucine takes a red color, as with nitric acid.—*A. I. Brociner, in J. de Ph. et de Ch.; Union Ph.*, October.

ACTION OF HYPOBROMITE OF SODIUM UPON CERTAIN AROMATIC DERIVATIVES; AND DIFFERENTIAL REACTION BETWEEN HIPPURIC AND BENZOIC ACIDS.—If hypobromite of sodium containing an excess of alkali be boiled with hippuric acid, gaseous bullæ are disengaged and the liquid clouds with a reddish-yellow tint. The precipitate, which goes down on cooling, appears as a powder of a kermes-red color. Benzoic acid under like conditions gives no reaction. Glycocol causes a decoloration of the hypobromite, with a disengagement of azotic gas. Testing the action of hypobromite of sodium upon a large number of azotized products of the aromatic series, the following results were obtained: *Benzamide* and *Benzonitril* gave nothing when cold; on ebullition, gave a kermes-red precipitate. *Aniline;* the aqueos solution—even when largely diluted—gave an orange precipitate; the reaction was nearly as sensitive as that of the hypochlorite of lime. *Methylaniline;* a yellow precipitate slightly greenish when cold, but becoming red on boiling. *Toluidine;* same results as for aniline; the precipitate is browner. *Anilides;* nothing with cold; on boiling, a reddish precipitate. An odor of cyanide of methyl is disengaged. *Hydrochlorate of diamine-metaphenylene, diamido-benzoic acid, diamine-toluilene;* all gave—hot or cold—a red maroon precipitate. *Ferrocyanides, ferricyanides, nitro-prussiates;* on boiling, all gave a red precipitate of ferric hydrate. *Pyridine;* no reaction. *Quinoleine;* does not give the orange-red precipitate except—which is frequently the case—aniline is present.—*Acad. des Sci.*, cvii, 662, 1888; *J. de Phar. et de Chim.*, Dec. 1, 1888.

GLEANINGS FROM THE GERMAN JOURNALS.

By F. X. Moerk, Ph. G.

Carbohydrates in urine.—N. Wedenski, by precipitation with benzoyl chloride in presence of NaOH, obtained the compound ethers of two carbohydrates, of which one was decomposed by boiling with excess of NaOH; the other was not acted upon by this reagent but was afterward easily decomposed by boiling with dilute H_2SO_4. The former corresponds to the compound ether of the starch group, the latter to the glucose group. Fehling's solution is reduced by the latter, but only after treatment with dilute acids by the former; this also answers to the test for animal gum found by Landwehr in urine by precipitating with copper sulphate, washing, drying, dissolving in HCl adding alcohol when the substance is reprecipitated, especially on warming to 60°.—*Ztschr. f. Physiol. Chemie*, xiii, 122.

Digitalis ambigua, which in some countries is more common than D. purpurea, contains according to Paschkis, the same constituents found in D. purpurea. Following the method of Schmiedeberg he obtained digitonin, digitonein, digitoginin, digitalin, digitalein and digitoxin. In an aqueous extract chrysophanic acid was detected. The medicinal properties of the two drugs are identical.—*Apoth. Ztg.*, 1888, 869.

Diphenylmethylpyrazol analogous in composition with antipyrine and used for the same purpose, is made by the action of benzoyl-acetic ether upon phenyl-hydrazine and then introducing the methyl group. It forms white needles melting at 150°, is difficultly soluble in water and ether, easily soluble in alcohol and glacial acetic acid, and differs from antipyrine in being a strong base; also in the reactions with nitric acid and with ferric chloride, these not being so characteristic.—(*Ztschr. f. Angew. Chem.*) *Pharm. Centralh.*, 1888, 463.

Iodoform in its behavior towards ether differs considerably, some brands marked *absolute* giving with this solvent dark colored solutions owing to liberation of iodine, probably due to an impurity of the iodoform which is decomposed by ether.—*Neuss, Pharm. Ztschr. f. Russl.*, 1888, 681.

Benzoic Acid crystals on vanilla beans may be distinguished microscopically from vanillin; the former are needle-shaped, the latter tabular crystals. Dilute sodium carbonate will extract the former and on acidifying with sulphuric acid and adding a little metallic magnesium or zinc the odor of oil of bitter almonds will be developed.—*Schimmel & Co., Pharm. Centralh.*, 1888, 537.

Antiseptic sponges for gynæcological operations.—The sponges are placed for 2 hours in a solution composed of corrosive sublimate 1·0, carbolic acid 5·0, alcohol 60·0, water 500·0; after expression they are allowed to dry in the air and may be impregnated with one of the following solutions: I. Boric acid 15·0, boiled water 500; II. Tannin 30, boiled water 500·0; III. Solution ferric chloride 40·0, boiled water 500.0.—*Pharm. Centralh.*, 1888, 558.

Filicic Acid.—G. Daccomo prepared the acid by agitating the ethereal extract (oleo-resin) with a mixture of two volumes 95 per cent. alcohol and one volume ether, which precipitated the acid as a brown resinous mass. After purification a glistening, odorless pale-yellow crystalline powder was obtained, melting at 179–180°. Heated above 100°, it assumes a golden color, taking the original color again on cooling. Insoluble in water, sparingly soluble in absolute alcohol; more soluble in glacial acetic acid, ether, amylic alcohol and toluol; easily soluble in chloroform, carbon disulphide and benzol. Its formula is $C_{14}H_{16}O_5$. Heated in a sealed tube to 170–190°, it is decomposed into isobutyric acid, and a red substance, having the formula $C_{20}H_{18}O_7$. $C_{14}H_{16}O_5+H_2O=C_4H_8O_2+C_{10}H_{10}O_4$. Two molecules of the last substance, by loss of one molecule of H_2O, give the compound $C_{20}H_{18}O_7$. By oxidation with $K_2Mn_2O_8$, and also with HNO_3, butyric and oxalic acids are formed. If the compound $C_{20}H_{18}O_7$ be allowed to stand several days with HNO_3, from the solution can be obtained pearly scales, melting between 198° and 202°, sublimable, the sublimate melting at 127–129°; by analysis found to be phthalic acid; oxalic acid is also formed by this oxidation. These reactions indicate that filicic acid is the isobutyrate of oxynaphthoquinone.—*Ber. d. d. Chem. Ges.*, 1888, 2962.

Cantharides.—Baudin has found that this drug appears in the market, partially deprived of the cantharidin by extraction with a menstruum containing sulphuric acid; the ash then contains an undue amount of sulphate. In determining the cantharidin, he recommends it to be carried out in two stages; first, exhausting with chloroform, which removes the free cantharidin, and then with chloroform containing 2 per cent. HCl, which dissolves the combined cantharidin. Cantharides contain about 1 per cent. total cantharidin, 0·72 per cent. free, and about 0·3 per cent. combined.—*Apoth. Ztg.*, 1888, 921.

Pilulæ odontalgicæ.—Cocaine hydrochlorate 16·0, powdered opium 64·0, menthol 16·0, powdered althæa 48·0, mix with glycerin and mucilage of acacia and divide into pills each weighing 0·03. One pill to be placed in the cavity of the tooth.—*Apoth. Ztg.*, 1888, 921.

Fragrant sulphur balsam.—The medicinal sulphur balsam prepared by heating together sulphur with Venetian turpentine and oil of turpentine, is of a very disagreeable odor and taste. By substituting for the oil of turpentine, olive oil, a pleasant fragrant product results.—*H. Borntræger, Chem. techn. Zeitung.*, 1888, 739.

Atomic weight of tin determined by Bougartz and Classen is 118·8 (O=15·96) or 119·1 (O=16). This is the mean of 26 (out of 47) determinations made by decomposing by electrolysis $SnCl_4 + 2 NH_4Cl$ and $SnCl_4 + 2 KCl$. The other 21 determinations were made by electrolysis of $SnBr_4$ and oxidation of Sn to SnO_2 but these showed greater differences between maximum and minimum and hence were omitted.—*Ber. d. d. chem. Ges.*, 1888, 2900.

Paraffin in crude petroleum, and lubricating and burning oils can be estimated by agitating 5–20 cc. of the sample with 100–200 cc. glacial acetic acid, collecting the separated paraffin on a weighed filter, washing first two or three times with the acid and then several times with 75% alcohol, drying and weighing; or the insoluble portion can be dissolved off the filter by petroleum ether into a weighed beaker, evaporated, dried and weighed.—*Pawlewski and Filemonowicz, Ber. d. d. chem. Ges.*, 1888, 2973.

Insect powder colored with curcuma can be told by making an alcoholic tincture, concentrating on a water-bath and impregnating strips of filter paper with the residue. These strips with boric acid give an orange-red color, on addition of NaOH turning green. Insect powder, composed of the flowers only, should give an ash of a decided green color, due to the pressure of manganese compounds; the stems are almost free from manganese. Barium chromate has been used to impart color to the insect powder.—*C. Schwarz, E. Ritsert, Pharm. Ztg.*, 1888, 692, 715.

Rubber drains may be hardened by immersion of the rubber tubing (red tubing is the best) for five minutes in concentrated sulphuric acid (whereby a dark brown color is imparted) washing with 75 per cent. alcohol and disinfecting by macerating in a 5 per cent. carbolic acid solution or in a 1 to 2 per cent. mercuric chloride solution.—(*Med. Chir. Rdsch.*) *Pharm. Centralhalle*, 1888, 572.

Pure glycerin should conform to the following tests: 1. neutrality towards litmus paper; 2. complete volatility between 150° and 200°, one drop heated on an object-glass over a moderate flame should leave no residue; 3. non-reducibility of ammoniacal silver nitrate, 1 cc. of the sample heated to the boiling point with 1 cc. ammonium hydrate and five drops of silver nitrate solution added should not become colored nor deposit a precipitate within five minutes.—*E. Ritsert, Pharm. Ztg.*, 1888, 715.

Cotton-seed oil in olive oil.—E. Hirschsohn discovered that a chloroformic solution of auric chloride (1 gm. in 200 cc.) gave on warming with cotton-seed oil an intense raspberry-red color, while pure olive oil with the same reagent gave no reaction. To apply the test, 3 to 5cc. of the oil with 6-10 drops of the auric chloride solution are placed in a water-bath and heated to 100° for twenty minutes. *Cotton-seed oil* develops the color in a few minutes; of other oils tested *hemp, linseed, poppy, almond, olive, rape, turnip, mustard, sesamum, sunflower, peach-kernel* and *grape-seed oils* gave no reaction; *peanut* and *castor oils* gave a slight deposit of metallic gold without imparting any color to the oils. The addition of 20% cotton-seed oil to the *drying oils* could not be detected, while the addition of 10% could be detected in *peanut, poppy, turnip, castor, olive, sesamum, almond* and *sunflower oils.* The prettiest tests were gotten with olive, sesamum and almond oils. Further experiments with olive oil proved that the addition of *one per cent.* of cotton-seed oil could certainly be detected by the method given above. By noticing the depth of color and the time required to produce it approximate results can be obtained. —*Pharm. Ztschr. f. Russl.*, 1888, 721.

Hydrochlorate of Apomorphine has been extensively tried by Dr. Socquart, of Brussels, as a remedy for certain kinds of cough, particularly in distressing and frequent hacking, unattended with expectoration, or with exceedingly difficult expectoration. The drug is, as a rule, well borne, although a few individuals manifest a special susceptibility to its action, and rarely nausea, colic, and diarrhea result from its employment. The dose is only about one-twentieth grain, given in water in the twenty-four hours. As the solution rapidly alters by keeping, it is advised to prevent its decomposition by the addition of a few drops of hydrochloric acid, which does not interfere with the therapeutic effects.—*Weekly Med. Rev.*, April 28, 1888.

DENSIMETRIC ESTIMATION OF ALBUMIN IN URINE.[1]

By Záhor.

Although it has been shown that from the theoretical side there is much to be urged against the densimetric method, yet it is found in practice, in cases where accuracy to the first place of decimals is sufficient, that the method is extremely quick and handy. This is felt nowhere so much as in estimations of albumin in urine, and the following method is simple, and can be carried out clinically:—

The filtered urine is mixed with just so much dilute acetic acid that when it is boiled all the albumin is coagulated; the right proportion may be ascertained with a small quantity of the urine in a test-tube beforehand. On being filtered from the coagulum, the filtrate should give no cloudiness with acetic acid and potassium ferrocyanide. A quantity of the urine is then placed in a flask firmly closed with a clean caoutchouc stopper. The flask is hung for 10 or 15 minutes in a large bath, filled with water kept boiling. By this means the albumin is precipitated. It is then filtered off, the funnel leading through a cork with a hole in it into a flask, and being covered with a glass plate. The density of the urine and the filtrate is then estimated, not with a pycnometer (that is unnecessary for clinical work), but with an aräometer marked to four places of decimals. Both fluids must be kept at the same temperature. This is best done by placing them in two cylinders, both immersed in a large vessel of water, which should be kept at the same temperature if a series of observations are to be made. The temperature of 17·5° degrees will be found most convenient. The difference between the two specific gravities is then multiplied by 400, and the product gives the number of grams of albumin in 100 cc. of urine.

A large number of illustrative experiments are quoted, in which the approximate accuracy of this simple process is demonstrated. The number 400 is the mean in round numbers of the factor $\frac{100v_2}{v(v_2 - v_1)}$.[2] The question naturally arises why a constant factor should give such good results in albuminous urine, when not only theoretically but also in practice it yields fallacious results in other albuminous fluids, such as the blood, transudations, white of egg, etc. The reason is that the factor must be multiplied by the difference in the specific gravities. In proteïd solutions (other than albuminous urine) this difference varies from 0·0016 and 0·0128, whilst in albuminous urine this difference is much smaller, varying between 0·00012 and 0·00200; that is, in the former case the difference is from 6 to 13 times greater than in the latter, and therefore so many times greater will be the error introduced by the use of a constant factor. In the case of urine, this error may be neglected.

---

[1] *Zeit. physiol. Chem.*, xii., 484–495; reprinted from *Jour. Chem. Soc.*, Nov., p. 1227.

[2] v is spec. grav. of the urine; v_2, spec. grav. of the proteids; v_1, spec. grav. of urine minus proteids.

ON THE ACIDS OF GASTRIC AND INTESTINAL JUICES.[1]

By Dr. Poulet.

The author's method of obtaining the acid principle of the stomach and intestine consists in dialyzing either the contents of the stomach or intestine obtained from an animal in full gastric or intestinal digestion, or the scrapings of the gastric or intestinal mucous membrane. After dialyzing for twenty-four hours, the resulting liquid is evaporated at a gentle heat down to about thirty grams, and then treated in a wineglass with sulphuric acid. In the case of the stomach of the pig and man hippuric acid in abundance crystallizes out; in that of all carnivorous animals, tartaric acid, whilst tartaric acid is found to be the acid separated from the intestine. It would be tedious to follow the author through the exposition of his methods and results at any length. His conclusions have certainly the charm of novelty, but many objections present themselves to his method as a means of obtaining the free acid secreted either in the stomach or intestine. It will be sufficient to give his conclusions as summarized, and to refer for details to the original paper.

The gastric juice of omnivorous adults, and notably of healthy men, contains, in the first stage of digestion, hippuric acid alone. Towards the end of the digestive act a mixture of hippuric and tartaric acids is found. The latter is alone found in the secretion of the mucous membrane of the empty stomach. Before weaning, tartaric acid is the chief acid found. Since tartaric acid has been found to be the acid secreted by all carnivora, recourse must be had to the pig, which in its dental and digestive system corresponds with man, in future experiments.

---

[1] "Nouvelles recherches expérimentales sur les principes acides du suc gastrique et sur celui du suc intestinal" in *Archiv. de physiolog. norm. et pathol.*, Oct. 1st, 1888; abstract reprinted from *The Medical Chronicle*, December.

In dyspeptic men, a quarter of an hour after eating, tartaric acid and hippuric acid were found together. It may be conjectured that in grave diseases of the stomach hippuric acid may be entirely replaced by tartaric.

In all the cases examined in healthy or sick men, and also in animals, no lactic or sarcolactic acid was found.

The hippuric acid of the gastric juice possesses all the properties of that extracted from the urine of herbivora in crystallization, physical aspect, and reduction to benzene by dry distillation with caustic potash, mixed or not with quick lime. But the tartaric acid of the gastric juice differs from the vegetable acid in some of its properties, especially in that it is attacked and decomposed in the cold by concentrated sulphuric acid.

The reactions of dialyzed gastric juice on coloring matters differ very much from those of hydrochloric acid. On the contrary, they resemble either those produced by hippuric acid or tartaric acid. The yellow color of Uffelmann's reagent, which has been attributed exclusively to lactic acid, may be just as well due to tartaric or hippuric acid, and is not characteristic, therefore, of the former.

When a dilute solution of hydrochloric acid is added to Gunzburg's reagent, and it is heated, a red color appears, at a temperature of 75° to 78°. A similar color is produced by hippuric acid, but at a temperature of 105° to 108°. It is, therefore, incorrect to assert that only inorganic acids produce the red color, and that Gunzburg's solution is the reagent for hydrochloric acid. When normal gastric juice is used it is not at 75° that the red coloration appears, as would be the case if it contained hydrochloric acid, but the temperature must be raised to 105°, precisely that at which it is acted on by hippuric acid.

The intestinal juice is acid in the whole extent of the small intestine during the period of intestinal digestion. The principle which acidifies it is none other than the same tartaric acid which is secreted by the mucous membrane of the empty stomach, in young animals during lactation, and in adult carnivora during digestion.

JAS. MCNAUGHT.

CHEMICAL OBSERVATIONS ON TARTAR EMETIC.[1]

By Prof. Dunstan and Miss L. E. Boole.

Communication from the Research Laboratory of the Pharmaceutical Society.

1. ON SOME STATEMENTS IN THE BRITISH PHARMACOPŒIA.

For the determination of the antimony in tartar emetic the pharmacist may be supposed to rely on the process described in the British Pharmacopœia. "Twenty-nine grains dissolves (*sic*) slowly but without residue in a fluid ounce of distilled water at 60° F. (15·5° C.), and the solution gives with sulphuretted hydrogen an orange precipitate which when washed and dried at 212° F. (100° C.) weighs 15·1 grains."

These instructions stand in need of considerable amendment to render them of any service in practice. Unless the solution is first acidified, oxy-salt is invariably carried down with the sulphide, and this together with free sulphur, will cause the result to be higher than that which is demanded by the known composition of the salt. Acid tartrate of potassium is also precipitated, and it is difficult to remove the whole of this salt from the precipitate unless it is washed with an unusually large quantity of water. Further, it is extremely difficult to filter the finely divided sulphide, in fact, it is almost impossible to do so, unless the liquid containing the precipitate is boiled for some time; but this generally leads, when free acid is present, to the decomposition of some of the sulphide, and in this way error is introduced. Again, antimony sulphide cannot be completely dried at 100° C. A small quantity of water, about two per cent., is obstinately retained, and is only lost with difficulty at a higher temperature; indeed, according to Fresenius, even at a higher temperature a current of carbon dioxide is necessary to effect its entire expulsion. It is chiefly for these reasons that chemists in general have long since abandoned the method of directly weighing the antimony sulphide, and yet the process is adopted, as a test of purity, in the British Pharmacopœia without any allusion to these various sources of inaccuracy. Lastly, it should be observed that the amount of antimony sulphide represented by the Pharmacopœia as obtainable from 29 grains of tartar emetic is 15·1 grains, whereas the quantity demanded by the formula of the salt ($SbOKC_4H_4O_6$, $\frac{1}{2}H_2O$) is only 14·67 grains.

---

[1] Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, November 14, reprinted from *Phar. Jour. and Trans.*, Nov. 17.

2. THE VOLUMETRIC ESTIMATION OF THE ANTIMONY IN TARTAR EMETIC.

Having regard to the extensive employment of tartar emetic in medicine, it is clearly desirable that a trustworthy and simple method for its quantitative analysis should be available for use by the pharmacist. A volumetric process has been proposed which involves the use of standard solutions of bleaching powder and potassium arsenite. For the pharmacist this process is inconvenient, since it necessitates the employment of two volumetric solutions which must be specially prepared.

It seemed worth while to attempt to utilize, for a volumetric process, the decolorization of a solution of iodine, which is effected by a solution of tartar emetic, on the basis of the reaction

$$SbOK{\cdot}C_4H_4O_6+I_2+2H_2O=2HI+KHC_4H_4O_6+HSbO_3.$$

Mohr had already proposed to utilize this oxidation as a volumetric operation applicable to antimonious compounds, and on his recommendation the process is not infrequently described in treatises on volumetric analysis. The method has been tested by Fresenius, whose results were not quite satisfactory, being in general slightly too high· It appeared desirable that a further trial of the method should be made.

Tartar emetic was several times crystallized from water, and the crystals dried by exposure in a partial vacuum. To establish the purity of these crystals the amount of potassium was determined. As this proved to be a troublesome operation, it may be well to give some account of the different experiments which were made, as well as of the method finally adopted. In order to separate the potassium it was necessary first to remove the whole of the antimony from a solution of the salt. Many attempts were made to effect this removal by means of hydrogen sulphide, but these failed, chiefly for reasons which have already been alluded to. Neither was it found practicable to remove the antimony by the evaporation of a solution acidified with hydrochloric acid, since a small quantity of antimony was dissolved when the residue, left on ignition, was boiled with water. Simple ignition of the salt and extraction of the mass with water failed for the same reason. The plan which answered best was to precipitate a solution of the salt with ammonia, which effected the removal of nearly the whole of the antimony as antimonious hydrate, a small quantity being subsequently separated during the evaporation of the ammoniacal filtrate. Since ammonium and potassium tartrates remain dissolved it is necessary before the potassium can be estimated to ignite the residue left after evaporation. This is accomplished at a low red heat, and the carbonaceous mass is boiled and washed with water, and the potassium finally precipitated as platinochloride in the usual manner, or more simply, the solution may be titrated with an acid solution of known strength. Working in this way, 1·7408 gram of tartar emetic yielded an ash containing 0·3615 gram of potassium carbonate; the quantity of potassium carbonate calculated from the formula $SbOKC_4H_4O_6, \frac{1}{2}H_2O$ is 0·3617 gram. Having thus established the correspondence of the crystals with the formula ($SbOKC_4H_4O_6, \frac{1}{2}H_2O$) they were used in the subsequent experiments. Trials were first made with solutions of tartar emetic acidified with hydrochloric acid, which were titrated with a decinormal solution of iodine, using starch as an indicator. The quantity of hydrochloric acid added was, in each experiment, exactly sufficient to form potassium chloride from the tartar emetic. The dilution of the solution was varied, but without appreciably affecting the results. Although some of the experimental data recorded below agree fairly well with the calculated numbers, yet the method cannot be trusted, on account of the absence of any sharp termination of the reaction, which lags increasingly with each addition of iodine. This difficulty sufficiently explains the discrepancies in the results, which are here recorded :—

Tartar emetic taken.	Dilution of the liquid.	Tartar emetic found.
0·10	40	0·098
0·10	60	0·097
0·10	80	0·099
0·20	160	0·195
0·20	100	0·195

Experiments were next made with solutions of tartar emetic to which sodium bicarbonate had recently been added. When this salt is dissolved in a solution of tartar emetic no visible change is observed at first, but after the lapse of a few minutes the liquid becomes turbid, and gradually nearly the whole of the antimony falls as a white precipitate of antimonious hydrate.

$$NaHCO_3+Sb.OK.C_4H_4O_6+H_2O= \\ KNaC_4H_4O_6+Sb(OH)_3+CO_2.$$

If a solution of iodine is added to the liquid before the precipitation has commenced it is immediately decolorized, and a sharp termination of the reaction is observed. If, however, the solution of iodine is not added until precipitation has commenced, then wholly incorrect results will be obtained, since the precipitated hydrate is hardly attacked by the iodine. To illustrate the importance of accomplishing the reaction before precipitation has set in, an experiment may be quoted in which two solutions of tartar emetic containing precisely the same quantity of the salt were mixed with an equal quantity of sodium bicarbonate. In the one solution, titration with iodine was immediately performed, when it was found that 18 cubic centimetres of the decinormal solution of iodine were consumed. In the other solution titration was not commenced until after the lapse of some hours, by which time nearly the whole of the antimony had been precipitated. The mixture was now found to require less than half a cubic centimetre of the solution of iodine to complete the oxidation of the small quantity of antimony compound which had not been precipitated. For this reason, a solution of bicarbonate should be added to the dissolved tartar emetic immediately before the titration is conducted. In the experiments recorded below from 10–20 cubic centimetres of a five per cent. solution of sodium bicarbonate were employed, and the dilution of the solution was varied. We have not found a large quantity, either of sodium bicarbonate or of water, to affect the chemical change to any appreciable extent. In practice, it will be found that 0·2–0·3 gram of tartar emetic is a convenient quantity to take for each estimation.

Tartar emetic taken.	Dilution.	Tartar emetic found.
0·1 gram	80 cc.	0·100
0·1 "	100 "	0·100
0·2 "	20 "	0·200
0·2 "	100 "	0·200
0·4937 "	100 "	0·4926
0·5472 "	100 "	0·5465

These results conclusively prove that the reaction occurring between solutions of tartar emetic and iodine in the presence of sodium bicarbonate is quite definite, and may be utilized as the basis of a volumetric operation in which solutions of tartar emetic, with sodium bicarbonate, are titrated with a decinormal solution of iodine in the usual manner.

3. ACTION OF ALCOHOL ON AN AQUEOUS SOLUTION OF TARTAR EMETIC.

When alcohol is added to an aqueous solution of tartar emetic a white precipitate is produced. This has been alleged to consist either of finely divided hydrous crystals or perhaps of the anhydrous salt. The use of anhydrous salt in quantitative experiments such as we have conducted is of much assistance, since the hydrous crystals are liable to alter their composition, owing to efflorescence. We therefore investigated the composition of this precipitate after it had been quickly dried, first at 50° C., and finally in a partial vacuum, over calcium chloride. The white powder was dissolved in water and the liquid was titrated with a solution of iodine. The results obtained were as follows:—

Weight of salt taken.	Weight of salt found, calculated as $SbOKC_4H_4O_6$.
0·1656	0·1657
0·4960	0·4957

They prove that the precipitate, prepared as above described, is entirely constituted of anhydrous tartar emetic.

3. THE SPECIFIC ROTATION OF AQUEOUS SOLUTIONS.

The action of aqueous solutions of tartar emetic on polarized light is very rarely alluded to in treatises on chemistry. Solutions of the salt are powerfully dextro-rotatory. Determinations of the specific rotation have been made by Landolt and by Krecke. Landolt found that 7·982 of anhydrous tartar emetic dissolved in 100 cc. of water effected at 20° C. an amount of rotation equivalent to $[\alpha]_D = +142{\cdot}76°$. Krecke found that a five per cent. solution of tartar emetic at 25° C. effected a rotation corresponding to $[\alpha]_D = +138{\cdot}66°$. We have made several determinations at 15° C. with a four per cent. solution of the crystallized salt, using a tube 200 mm. long. The angle of rotation under these conditions is +11·3°, whence $[\alpha]_D = +141{\cdot}25°$, and for the anhydrous salt under the same conditions +11·4, whence $[\alpha]_D = +142{\cdot}5°$. This result is probably in agreement with that obtained by Krecke at 25° C., since it is known that an increase of temperature causes a decrease in the specific rotation of this compound.

It is a remarkable fact that a solution of tartar emetic possesses a much greater specific rotation than a corresponding solution of any of the commonly-occurring tartrates. For acid tartrate of potassium, for instance, $[\alpha]_D = +22{\cdot}61°$. The high specific rotation is therefore characteristic of tartar emetic, and might be usefully employed as a test for the purity of salt. Thus we have found that an admixture of five per cent. of acid tartrate of potassium with tartar emetic reduces the rotatory power of a 4 per cent. solution of the salt to +10·6° (200 mm. at 15° C.) that is for $[\alpha]_D + 132{\cdot}5°$.

By means of its action on polarized light a solution of tartar emetic may readily be distinguished from any of the double oxalates of antimony and potassium, which are used in dyeing as substitutes for tartar emetic, since solutions of these salts are devoid of action on polarized light.

4. AN EXAMINATION OF COMMERCIAL SPECIMENS.

It seemed to be of interest to determine the purity of the tartar emetic employed in medicine. Twelve specimens were purchased from pharmacists. The antimony was estimated by titration of the dissolved salt with a standard solution of iodine in the manner previously described. The results were as follows:—

Analyses of Commercial Specimens of Tartar Emetic.

No. of specimens.	Weight of salt taken.	Weight of salt found.	Percentage of ($SbOKC_4H_4O_6,\frac{1}{2}H_2O$).
1	0·236	0·2415	102·3
2	0·3515	0·3554	101·1
3	0·2584	0·2608	100·9
4	0·2218	0·2221	100·1
5	0·2511	0·2491	99·2
6	0·2649	0·2633	99·4
7	0·3373	0·3336	98·7
8	0·2602	0·2562	98·4
9	0·2894	0·2825	97·6
10	0·2305	0·2235	96·9
11	0·2539	0·2426	95·5
12	0·2434	0·2305	94·7

It will be seen that many of these specimens are of such purity as one might reasonably look for in commerce. It is noticeable, however, that several specimens have yielded more antimony than is obtainable from a salt of the formula ($SbOKC_4H_4O_6,\frac{1}{2}H_2O$). We have investigated the cause of this anomaly and find it to be due to the absence from the salt of the proportion of water indicated by the usual formula, loss having occurred from the efflorescence of the crystals, which readily takes place when they are kept in air. That this is the cause of the discrepancy was proved by estimating the water in a specimen which had afforded an anomalous result. The specimen selected for this purpose was that numbered 1 in the foregoing table, which contained an amount of antimony corresponding to 102·3 of crystallized tartar emetic. This salt, on being dried between 100°–110°, lost only 0·52 per cent. of water, instead of 2·72 per cent., and by calculating, on this basis, the percentage of crystallized tartar emetic, it is found to be 102·2 per cent., a result which agrees with that obtained by the direct determination of the antimony. The occurrence of efflorescence to a greater or less extent therefore explains these high results.

A few specimens afforded results rather below the average, notably the specimen numbered 12 in the table. None of these specimens dissolved completely in the necessary quantity of cold water. Two grams of the specimen numbered 12 in the table were warmed to about 50° C. with 34 cc. of water. This liquid when cooled to 15° C. and maintained for some hours at that temperature yielded crystals which were recognized as acid tartrate of potassium. The potassium in the salt was also estimated and found to be higher than that required by the formula ($SbOKC_4H_4O_6,\frac{1}{2}H_2O$). The rotatory power of a 4 per cent. solution was determined at 15° C. in a tube 200 mm. long. The angle of rotation was $+10·5°$, whence $[\alpha]_D=131·25°$, a result which approximately agrees with that which had been previously obtained with a solution of tartar emetic known to contain 5 per cent. of acid tartrate of potassium. It was thus proved that the specimen contained about five per cent. of acid tartrate of potassium. This specimen, which was in fine powder, had also probably suffered efflorescence, but we had not a sufficient quantity to determine whether this was the case. Whether this impurity had been fraudulently added, or had arisen from careless preparation of the salt or from a mode of decomposition of the pure sale at present unknown, it is impossible to say. Inasmuch as other specimens which afforded low results likewise failed to completely dissolve in the requisite quantity of cold water and also appeared to contain acid tartrate of potassium, it seems not improbable that the crystallized salt is subject to spontaneous decomposition. This supposition is strengthened by the observation that each of these same specimens yielded, when mixed with cold water, more or less of an insoluble residue consisting of antimony oxide. Experiments are now being made with pure tartar emetic to test the correctness of this suggestion.

5. THE PREPARATION OF A STABLE SALT FOR USE IN MEDICINE.

It would be a distinct advantage if it were required that the anhydrous salt should alone be used in medicine. It is, as we have shown, easily prepared pure, and when once prepared it is not, as the hydrous crystals are, liable to spontaneous change, and in addition it is more readily soluble in water. To prepare the anhydrous salt a strong aqueous solution of tartar emetic is precipitated by a large excess of methylated spirit, the precipitate is decanted or filtered, washed with methylated spirit, and quickly dried over a water-bath. The specific rotation of aqueous solutions of this salt has been mentioned in a previous part of this paper. The solubility in water was determined at 15°. It was found that one part of the salt dissolved in 14·53 parts by weight of water.

ISATROPYLCOCAINE.[1]

By C. Liebermann.

An alkaloid which the author names isatropylcocaine is present in the mixture of amorphous alkaloids obtained as a bye-product in the preparation of cocaine.

Isatropylcocaine, $C_{19}H_{23}NO_4$, is prepared in the pure state as follows: the yellow, sticky, amorphous mixture is dissolved in hydrochloric acid and the filtered solution extracted with ether. The extract contains considerable quantities of benzaldehyde. The solution is freed from ether by means of a stream of air and the base precipitated fractionally with alkali. It is then obtained in the form of a white, chalky, amorphous powder, the quantity of which is about 70 per cent. of the crude material. The middle fractions are dissolved in hydrochloric acid, again fractionally precipitated with soda, extracted with light petroleum to remove traces of cocaine, and dried in a stream of air for several days at the ordinary temperature, and finally at 45°.

---

[1] *Ber.*, xxi., 2342–2355; *reprinted from Jour. Chem. Soc.*, Nov., p. 1210.

The alkaline filtrate from the alkaloid contains ecgonine, the quantity of which is from 1 to 2 per cent. of the crude material.

Isatropylcocaine is very similar to cocaine, but both the base and its salts are amorphous, and the former is not so readily soluble in ammonia and light petroleum as cocaine. It is easily soluble in cold alcohol, ether, benzene and chloroform, but only very sparingly in light petroleum, and in all cases a resinous mass is obtained when the solvent is evaporated. It begins to soften at 65°, but has no definite melting point; at 90–100° it loses water slowly, and at 120° it turns brown and is gradually decomposed. All the salts are amorphous and soluble in water. Picric acid produces a yellow, chromic acid an orange, and potassium permanganate a violet precipitate, which changes to brown. The chlorides of mercury, tin, gold and platinum, and most of the usual reagents for alkaloids, also give amorphous precipitates. The alcoholic solution does not show an alkaline reaction with phenolphthalein, and is dextrorotatory.

The base is a powerful poison, but its action is not similar either to that of cocaine or atropine; the symptoms of poisoning sometimes observed after the administration of impure cocaine may be due to this alkaloid.

Methyl chloride is evolved when the base is heated with concentrated hydrochloric acid, and when boiled with strong hydriodic acid methyl iodide is obtained, the quantity of which, estimated by Zeisel's method, showed that one methyl-group has been eliminated. It is also decomposed, with separation of methyl alcohol, when heated for a long time with dilute sulphuric acid, but no ethyl alcohol is formed. When boiled for about an hour with hydrochloric acid, sp. gr. 1·1, it is decomposed into methyl alcohol, ecgonine, and isatropic acid in molecular proportions, as in the following equation:

$$C_{19}H_{23}NO_4+2H_2O=CH_4O+C_9H_{15}NO_3+C_9H_8O_2.$$

The product of the reaction is filtered and the two isatropic acids in the residue separated by means of their barium salts.

γ-Isatropic acid, $C_9H_8O_2$, forms about two-thirds of the residue. It crystallizes from 50 per cent. alcohol in small, colorless needles, melts at 274°, and is soluble in hot glacial acetic acid, but only very sparingly in ether, benzene and carbon bisulphide. The *barium* salt,

$(C_9H_7O_2)_2Ba$, is crystalline, and readily soluble in water. The *calcium, copper* and *silver* salts are soluble in water. The ethyl- and methyl-derivatives are very readily formed when hydrogen chloride is passed into a solution of the acid in the corresponding alcohol. The *ethyl* salt, $C_9H_7EtO_2$, is insoluble in ammonia and sparingly soluble in alcohol, from which it crystallizes in needles melting at 146°. *Methyl γ-isatropate,* $C_9H_7MeO_2$, crystallizes in plates or needles, melts at 174°, and distils at about 300° with very slight decomposition, but has no constant boiling point. A vapor-density determination in anthracene vapor showed that it is at first polymeric, and is only completely transformed into the simple molecule after about half an hour's heating.

δ-Isatropic acid, $C_9H_8O_2$, forms about one-third of the residue. It is more easily soluble in water than the γ-acid, and melts at 206°. Neither this nor the γ-acid yields benzaldehyde when oxidized with potassium permanganate or chromic acid. An aqueous solution of the ammonium salt gives precipitates with calcium chloride, mercuric chloride, and copper acetate. The *barium* salt, $(C_9H_7O_2)_2Ba$, is sparingly soluble in water. The *silver* salt, $C_9H_7O_2Ag$, is amorphous, but becomes crystalline when boiled with water. The *ethyl* salt, $C_9H_7EtO_2$, is a viscid oil; it has no constant boiling point, but after boiling for a long time it distils at 264–270°, and condenses to a colorless, mobile oil. The *methyl* salt, $C_9H_7MeO_2$, crystallizes from dilute alcohol in prisms or needles, melts at 76°, and is readily soluble in all solvents except water. A vapor-density determination in anthracene vapor showed that it is at first polymeric, but, the transformation into simple molecules takes place much more quickly than is the case with the corresponding salt of the γ-acid.

The acids described above are very similar in appearance and solubility to α-isatropic acid (Lossen, *Annalen*, cxxxviii, 235), β-isatropic acid (Fittig, *Annalen*, ccvi., 34), and the isatropic acids which the author has previously obtained from atropine, but they are not identical with any of these compounds. β-Isatropic acid seems to be formed when hydrogen chloride is passed into a methyl alcoholic solution of α-isatropic acid. *Methyl β-isatropate* melts at 91°.

The molecular weight of δ-isatropic acid, methyl and ethyl δ-isatropate, and methyl and ethyl γ-isatropate was determined by Raoult's method in glacial acetic acid solution, and in all cases the results agreed for the molecular formulæ given above; the salts are all reprecipitated unchanged when water is added to the glacial acetic acid solution. The acid filtrate from the atropic acids (see above) contains ecgonine and a very small quantity of a complex mixture of acids consisting principally of *s*-isatropic acid, but in which benzoic acid was recognized. Anhydroecgonine is also sometimes present. The quantities of ecgonine and isatropic acids are approximately in accordance with the equation given above.

Boiling baryta decomposes the amorphous alkaloid in a similar manner to hydrochoric acid, but the ecgonine is partially decomposed.

Other bases occurring with cocaine also yield ecgonine when treated with acids. The author has succeeded in preparing benzoylecgonine from ecgonine.

MASSOI BARK.

By E. M. Holms, F. L. S., Curator of the Museum of the Pharmaceutical Society of Great Britain.

Some specimens of the barks known in the East under this name, and which were recently presented to the Museum of the Society by Professor Van Eeden, of Haarlem, may possibly serve to throw some light upon a product concerning which some little confusion still exists in commerce.

The name of Massoi appears to be given to three distinct barks, which are identified by Dr. F. Hekmeyer as the products respectively of *Cinnamomum xanthoneuron*, Bl., *Cinnamomum Kiamis*, Nees, and *Sassafras Goesianum*, T. and B. The second is also called by the Malays "Kayu manis sabrang."[1]

The first of these, as received from the Haarlem Museum, occurs in pieces about 3 to 4 lines thick, with a thin, uneven, outer dark layer, which is seen under a lens to be composed of stratified cells; the layer beneath this is granular, the white sclerenchymatous bundles being irregularly arranged in a direction parallel to the surface, except near the inner surface, where they form two nearly regular lines. The portion next the inner surface is darker in color, forming rather more than one-third of the thickness of the whole bark, and shows numerous thin medullary rays. It is this portion of the bark that appears to be most oily and aromatic. The odor, when observed at a distance, resembles that of cocoanut milk. The taste is pungent, the flavor somewhat resembling the odor, but also recalling that of a mixture of cinnamon and rue.

---

[1] The name "sabrang" distinguishes it from the bark Kayu manis (*Cinnamomum Parthenoxylon*), which is also used by the Malays in colic and diarrhœa. Kayu manis, as represented in the late Colonial Exhibition in London, differs from all the above-named barks in having a somewhat camphoraceous taste.

The second bark is in quills like cinnamon, but as thick as cassia, somewhat wrinkled externally, extremely hard and woody, and is almost horny in consistence. It has very little odor, but a pungent taste, and a slight flavor between that of cinnamon and cassia. The inner surface is finely striated, and the transverse fracture is dark internally and paler towards the outer surface.

The third bark is thinner than the first, but resembles it in odor. The taste also is very similar, but more pungent and faintly bitter, causing a sensation of heat in the mouth for some time and an augmented flow of saliva. The bark is, however, only half the thickness, barely attaining two lines. It is paler in color in transverse section, is marked externally with faint longitudinal cracks, and is more markedly striated internally. In transverse section it presents a short granular fracture, the sclerenchymatous bundles being arranged at right angles to the surface, but the middle layer, corresponding to that of *C. xanthoneuron* in which these bundles are horizontally placed, is scarcely developed. *Cinnamomum xanthoneuron* and *Sassafras Goesianum* are both natives of New Guinea, and *C. Kiamis* of Java, Sumatra, and apparently also of Borneo.

All these barks are met with in the bazaars in Java, and are used in cases of colic and diarrhœa and in spasmodic affections.

According to Teysmann and Binnendyk *Sassafras Goesianum* yields the true massoi bark.

In the Hanbury Collection there is also a bark labelled massoi bark, corresponding exactly in structure, taste, and odor with the bark of *S. Goesianum.* It is labelled on the bark, apparently in the writing of Mr. Thos. Hanbury: "This bark I bought at a Kling shop; they could tell me nothing about it, except that it was used to scent or flavor medicines."

On the outside of the box it is labelled, in Daniel Hanbury's writing, "CORTEX MASSOI (of) *Blume's* 'Rumphia' (Laurineous?) bark, smelling like the Brazilian *Casca pretiosa.*[1] Bought at Singapore by Thos. Hanbury, 1853. Found this bark identical with that procured by Guibourt at the *Musée Japonais*, vide *Hist. des Drogues*, ed. iv., tom. ii., p. 383; compared the two at Paris, April 22, 1854."

---

[1] The bark of *Mespilodaphne pretiosa*, Nees.

On the inside of the cover of the same box is the following note:—"Professor C. L. Blume, in reply to my inquiry respecting this, a specimen of which I sent him, writes thus under date January 5, 1857.

"2. Écorce ayant l'odeur de la *Casca pretiosa* du Brésil (Singapore). C'est Cortex Massoi figuré dans la *Rumphia*, quoique la face interne de votre échantillon soit un peu plus claire, ce qui parait résulter de l'age de l'arbre. Son odeur pénétrant, balsamique, tirant sur l'essence de citron, est très charactéristique.[1] Je possède de cet arbre de la Nouvelle Guinée seulement les branches avec les feuilles, ce qui me met en état de dire que c'est bien une Laurinée mais n'appartenant pas au genre de Cinnamomum."

It may be here remarked that it is very difficult to describe an odor, and although Hanbury has identified it with Guibourt's bark, Écorce de massoy de la Nouvelle Guinée,' Guibourt gives quite a different description of its odor. When the odor, as in the case of Massoi bark, resembles a mixture of odors, it is naturally likened to different products by different observers. Guibourt, in the following description of the bark, likens it to cummin.

"Telle que je me la suis procurée à une exposition qui a en lieu il y a quelques années à Paris, sous le nom de Musée japonais, cette écorce est cintrée, épaisse de 7-8 millimetres, couverte d'un épiderme gris rougeâtre legèrement tuberculeux et formée d'un libre gris rosé dur et compacte à structure un peu radiée sur sa coupe transversale. Elle possède une odeur très forte, analogue à celle du cumin, et une saveur très-âcre avec le même goût de cumin."

I have, however, not depended upon my own opinion alone, but have obtained from more than one observer a corroboration of the opinion that the odor resembles that of cocoanut milk. Leaving, however, odor out of the question, Guibourt's description of the structure of bark corresponds exactly to the bark of *Sassafras Goesianum* of the Haarlem Museum, and as the Hanbury specimen has been identified by himself with Guibourt's, and by Professor Blume, with the bark of the tree described in "Rumphia," there can be no doubt that to this tree the true Massoi bark must be ascribed.

Whether or no this be the massoy bark from New Guinea from which Messrs. Schimmel also have distilled an oil having an odor resembling that of nutmegs and cloves, cannot be ascertained in the absence of specimens for comparison, but if their description of the odor be correct it is more likely to be the *Cortex Culilabani Papuanus* of Martiny's *Encyclopædia*, 1, p. 436.

---

[1] The lemon odor is not very perceptible; in the specimen it resembles more nearly rue or the fruits of *Xanthoxylum alatum.*

The specimen of this bark in the Hanbury collection has a flavor which might be likened to that of cloves and nutmegs. The bark is, however, quite different in appearance and odor from the true massoi bark,[1] being much thicker, softer, somewhat laminated, and not at all radiate in structure.—*Phar. Jour. and Trans.*, Dec. 15, p. 465.

THE ROOT OF VERNONIA NIGRITIANA.[2]

By E. Heckel and Fr. Schlagdenhauffen.

Under the name of batiatior or batjitjor a root is sold in different parts of Senegambia, which is supposed to have febrifuge, emetic, anti-hæmorrhagic, and antidysenteric properties. It has been described as a substitute for ipecacuanha, and is alluded to as such by Dorvault. It has recently been definitely recognized as the root of Vernonia nigritiana, a composite plant growing to the height of a foot or two and bears a faint external resemblance to ipecacuanha, which, when fresh, it is said to resemble in smell.

Heckel and Schlagdenhauffen find in this root no trace of any true alkaloid, but they have obtained from it a whitish, slightly hygroscopic glucoside, having the formula $C_{10}H_{24}O_7$, which they have called vernonin.

On injecting a solution of the alcoholic extract under the skin of the frog's thigh, paralysis of the limb thus injected followed, the respiratory movements were interfered with, and the heart's action was arrested in the same manner as after digitalis, convallaria, and strophanthus. On further examination of the heart movements by placing it between the cups of a Marey's cardiograph, it was found that after injecting $\frac{3}{10}$ths of a grain of vernonin the amplitude of the heart's movements was first slightly decreased and then increased, but in three-quarters of an hour they fell below normal and became slower;

---

[1] The name Kulit laban means clove bark, the word Laban or Lawang being probably the Malay pronunciation of the Sanskrit "Lavanga," and of the vernacular Hindostanee "Laung," which is applied to the clove, *vide* "Pharmacographia," p. 281.

[2] "Sur la racine de Batjitjor de l'Afrique tropicale, nouveau poison du cœur," in *Archiv. de physiologie normale et physiologigue*, August, 1888; abstract reprinted from *The Medical Chronicle*, Dec. See also Amer. Jour. Phar 1888, p. 347.

eventually the influence of the drug passed off. A larger dose ($\frac{9}{20}$ths grain) reduced the number of beats by one-third, the ventricles evidently filling slowly. A still larger dose ($\frac{7}{10}$ths grain) almost arrested the heart in systole, diastole only taking place imperfectly and at long intervals; eventually the heart stopped completely in systole. A pigeon was not influenced by $\frac{3}{4}$ths of a grain, but $2\frac{1}{4}$ grains killed it, the heart being arrested in systole.

The action of vernonin on the heart thus resembles that of digitalis. Heckel and Schlagdenhauffen, however, consider that it is twenty-four times weaker than the soluble principle of digitalis (digitalein).

They have studied the action of the drug on the skéletal nerves and muscles, and have come to the conclusion that it paralyzes locally nerves to which it is applied, but does not markedly influence the muscles. If the drug be injected under the skin of the thigh it soon comes to pass that galvanizing the sciatic on this side ceases to contract the muscles supplied by it, whilst muscles respond equally to the current on the two sides when directly stimulated.

Further experiments are adduced to show that the drug directly destroys the conducting power of the sciatic nerve in the frog, and that in warm-blooded animals it paralyzes the limb into which it is injected. The experimenters, however, have by no means fully shown the influence of vernonin on the nerve and muscle tissues, and some serious sources of fallacy seem to have been overlooked. It may be presumed that a drug which so powerfully influences the nerves must also affect the nerve endings, but no experiments on this point seem to have been made. No means seem to have been employed to prevent the circulation of poisoned blood from the injected to the non-injected leg; indeed, the investigations would lead to the conclusion that the drug is not thus carried, for it is stated that when the poison is injected under the skin of the back, stimulation of the sciatic nerves continues to cause contraction of the muscles. From this it would follow that either the poison does not reach the nerve endings of the leg muscles when injected under the skin of the back, or that it does not paralyze them. Further investigations must be made before the conclusions of Messrs. Heckel and Schlagdenhauffen can be accepted, but they have introduced us to a substance which manifestly has most interesting pharmacological properties and may have important therapeutic uses.

D. J. Leech.

NOTES ON THE PREPARATION OF DRUG SECTIONS FOR MICROSCOPICAL EXAMINATION.[1]

By F. Ashley Rogers, Pharmaceutical Chemist.

It is to be regretted that the great majority of pharmaceutical students of botany and materia medica, do not prepare their own specimens for the microscope, but rely upon the professional microscopist, who is not always a botanist, and has been known to supply the aerial stem labelled root. It would certainly be much more satisfactory in every respect if pharmaceutical students prepared their own objects in the microscopical study of materia medica and structural botany, and I trust that these notes will show the simplicity of the operations and their inexpensive nature.

We may occasionally wish to prepare sections of fresh vegetable tissue. These cannot be cut until they have previously been hardened, which is accomplished by soaking for a week or ten days in pure methylated spirit, which should be frequently changed, say every twenty-four hours, until no color comes away from the tissues. They can now be preserved in spirit, and are always ready for making sections.

But more frequently our drugs are obtained dry, and very hard; they must then be softened by soaking in water with a little methylated spirit, or even soaking in hot water, or in a three per cent. solution of potash (where it can be safely done), that is in cases in which the cell contents, being injured, unfit the section for examination. Sections of soft stems, ovaries, etc., may be made by hand. Take the specimen between the thumb and fore-finger of the left hand, hold the finger horizontally so that its upper surface may form a table, on which the blade of a razor may slide, keep the handle of the razor in a line with the blade, and draw it from heel to tip through the specimen and towards yourself; keep the blade well wetted with very dilute spirit, and float off the sections as they are cut into a saucer of water.

The drug specimen is however frequently too hard for section cutting, by hand; it is then necessary to use a microtome. A very good one is that invented by Mr. Stirling. This is simply a brass well, into which fits a very finely cut screw. The instrument having been firmly fixed to a table by means of another screw, the specimen is imbedded in a piece of carrot, or a mixture of lard and hard paraffin; the whole is put into the well, and as the screw is turned and gradually pushes out the whole of the contents of the well, sections are made with a razor or a section knife, which is nothing more than a large razor without a handle.

---

[1] Read before the Chemists' Assistants' Association, London, Nov. 22, reprinted from *Phar. Jour. and Trans.*, Dec. 1.

The knife and specimen should be kept well wetted with dilute spirit, and the sections may be kept until wanted in slightly diluted spirit. It is not necessary to use rectified spirit in section preparing, but the methylated spirit must not contain any kind of gum. A rough and ready test of the fitness of the spirit is to pour it into water; it should not affect the brilliancy of the water in the slightest degree.

For very friable tissues a special treatment is required. First soak the drug in strong alcohol, then it ether. Now prepare a solution of celloidin in equal parts of alcohol and ether, about the thickness of glycerin (reserve one-third of this solution). To one-third of this solution add its own bulk of alcohol and ether, in equal parts, and to the remaining one-third add twice its bulk of alcohol and ether in equal parts. Take the tissue out of the ether, and put into the thinnest of the above three solutions, for a few hours, then transfer to the thicker one for three or four hours, and lastly to the thickest for a day; take out and dry in the air and place in spirit until quite hard and opaque. It can now be easily cut.

The sections will be much more easily examined if they are stained one or more colors, and if they are to be stained they must usually be first bleached. First wash out the spirit by placing in water and then bleach by soaking in liq. sodæ chlorinatæ, B. P., for from two to ten hours. When all the color has disappeared from the sections wash them in water three or four times at least. They can now be kept in spirit until required. Judson's dyes were at one time used for staining these sections; but now specially prepared stains are more generally used, which can be bought, or made, if more than a very small quantity is required. For excellent recipes for such stains consult Bower and Vines "Practical Botany."

The spirit should first be washed out of the specimen. It should then be immersed in the staining fluid for from three to ten minutes, and washed in spirit for from ten to fifteen minutes. Lastly, the section, which now presents a dull appearance, is cleared by placing on some clove oil until it sinks (usually in about five minutes); it will then be found to be quite clear, and is ready for mounting in Canada balsam, or more conveniently a mixture of Canada balsam and one-fifth its bulk of pure turpentine.

The brightness of a section stained with borax carmine is increased by placing in a mixture of spirit and one-sixth its bulk of hydrochloric acid for a minute or so. The acid must afterwards, of course, be thoroughly washed out.

If a section is overstained it may be remedied by placing in a dilute spirituous solution of hydrochloric acid or dilute aqueous solution of acetic acid according to the stain used.

Double staining is accomplished by using alkaline and acid solutions respectively; for example, green and red by first placing in an acid green solution, washing with water, and then placing in borax carmine solution, then wash in spirit and clear in clove oil.

Clove oil is a very good clearing medium and a very good vehicle in which to preserve the sections until required for mounting, if it is intended to mount them in Canada balsam. If a specimen is stained before it is sectionized it must, of course, be left in the stain hours, and perhaps days, instead of minutes; this is only done with soft tissues, such as ovaries, which should be gathered before they are quite ripe. Fresh stems should not be more than three years old as a general rule.

Sections must not be bleached where there are cystolithes or any other cell-contents which the bleaching fluid would dissolve. Certain resinous drugs, such as pellitory, must not be mounted in Canada balsam, which would dissolve out the resin; in such cases glycerin jelly containing carbolic acid, arsenic, or some other preservative, should be used. This is best used, not with a rod, but filtered while hot, and liquid through cotton wool directly on to the slide. To keep glycerin in is a very difficult matter. Gold size, which is at least ten years' old and quite "tacky," or sticky, is a very good cement, but it should be touched over about every five years.

Certain black cements are very liable to run into the Canada balsam and spoil the sections.

In conclusion, I would reaffirm that it is cheaper to make than to buy a good collection of drug sections, especially as many are only obtainable on the continent.

PHOTOGRAPHY.

By F. V. Butterfield.[1]

With the exception of a short and succinct historical account, and a few necessary remarks on its relation to light and chemistry, I shall devote the best portion of this paper to the more important details and *modus operandi* of that branch popularly known as "amateur photography," so that any who are desirous of taking up this fascinating pursuit may be able to do so with, I hope, facility and ease. At the same time, however, others who cannot, for various reasons, take up the practice of photography for pleasure, or who rather choose to "scorn delights and live laborious days," will find, I am quite sure, a slight acquaintance with this subject either useful from a business, or interesting from a scientific point of view, for, disregarded as a work of art, but looking at it solely from a scientific standpoint a photograph may be considered simply as the result of a series of very delicate chemical reactions.

Boasting of barely half a century's existence, photography has made such rapid and gigantic strides that the position it holds to-day is one of the highest importance. Reverting to the details of its discovery we first of all find the old alchemists in the sixteenth century, whilst engaged in their mysterious craft, puzzling over the change they observed took place when silver chloride, or, as they termed it, luna cornua, was exposed to the light, and which, they eventually decided, must be due to a kind of transmutation of metals, a conclusion drawn very possibly, I think, from the philosopher's stone point of view, which when discovered would in some such simple manner "transmute" all the baser metals into gold.

The matter remains in *statu quo*, until another century "has dragged its slow length along," when history records that this phenomenon attracted the attention of one—Robert Boyle—the most learned philosopher of his time, and which he finally settled to his own satisfaction must perforce be caused by the action of the air, "sed de mortuis nil nisi bonum." He lived in dark days, when chemistry as a connected science could hardly be said to exist.

The question once more lapses for a long period into a state of quiescence, until at length Scheele, whose name is well known to all of you, appears upon the scene, deeply interested in and trying to solve this very problem, but although he succeeded in proving, by various means, that it was really owing to a reduction of the silver chloride, with partial loss of chlorine, his researches proved of little practical utility at the time.

Years roll on, iodine and bromine have both been discovered and found to give salts of silver much more sensitive to the light than the old chloride; in fact, on all hands we find the enthusiastic army of workers in this scientific research ever increasing and bringing matters gradually to a climax, which at last took place in 1839, a year ever memorable in the annals of photography as the period that marks its birth, and when Daguerre, a poor French painter, first exhibited to the gaze of an astonished world the great discovery which now bears his name, the daguerreotype, its appearance being warmly welcomed by the vast majority who saw at last a long felt want supplied, the very small minority consisting of those who gained a pittance by the art of miniature portrait painting, and to whom it was painfully apparent that their occupation had fled. The French government then granted the father of photography and his clever partner, Isidore Niepee, a pension, chiefly on the ground that "The invention did not admit of being secured by patent, since, as soon as published, all might avail themselves of its advantages; they therefore preferred to enjoy the glory of endowing the world of science and art with one of the most surprising discoveries that honor their native land."

---

[1] Read before the Chemists' Assistants' Association, London, November 29th; reprinted from *Phar. Jour. and Trans.*, December 15th.

In England, Wedgwood, bearing in mind the experience of Scheele with silver chloride, and assisted by Sir Humphry Davy, had been busily employed in conducting experiments at the Royal Institution with this substance; but, although he had actually succeeded in obtaining images, no method could, by any possible means, be discovered of "fixing" or making them permanent, so that, when exposed to the light, his pictures gradually faded from view.

Now, there is here real reason for regret, because a year or two later, before the discovery of the daguerreotype had taken place, Sir John Herschel first prepared and demonstrated the properties of hyposulphite, or more properly speaking, thiosulphate of sodium, particularly calling attention to the remarkable solubility of silver chloride in its solution. Here, then, was the very thing for which Davy had longed in vain, and it is now generally supposed that Herschel was ignorant of the results obtained and published a few years previously by Wedgwood and his illustrious assistant, Davy. Another circumstance, perhaps still more remarkable, is, that even Daguerre, when he made his great discovery known, was not in possession of any perfect method of fixing his pictures, and it thus remained for Herschel to once more call attention to his discovery as the only means by which photographs on silver salts could be permanently "fixed."

Herschel, also, first suggested the use of glass plates, and his cyanotype is, even now, largely used by draughtsmen and others for taking copies of drawings, tracings, etc. In this process one side of a sheet of white paper is brushed over (in the dark or some non-actinic medium), with a solution made by dissolving 1 ounce each of potassium ferricyanide and ferric ammonium citrate in 8 ounces of water. When dry it is ready for use, and may then be exposed to a good light, beneath the subject to be copied, and afterwards "developed" by simply washing in plain water. During the process of printing the ferric salt is reduced to ferrous by the action of the light (in the presence of organic matter), and this at once combines with the ferricyanide present, to form ferrous ferricyanide or Turnbull's blue, which, being insoluble, is not affected by the subsequent washing in water, whilst the unchanged ferric salt is easily washed out, and thus an exact facsimile of the subject, be it negative, drawing or tracing, remains.

In 1841 Fox Talbot patented his famous calotype process. By it he obtained invisible images on paper, made sensitive with silver iodide, and developed them by means of a solution of gallic acid. Paper negatives, which at the present time, by reason of their light weight, compactness, etc., are promising to supersede those of glass, are thus by no means "new," another proof that there is nothing new under the sun. There is this difference, however, that the image was in the *texture* of the paper in Talbot's negatives, whilst now it is on the surface, so to speak.

But if photography was not originally given out to the world as the invention of one of perfidious Albion's sons—although at the same time, be it remarked, historians generally concede to Wedgwood the honor of having been the *first* photographer—we can console ourselves with the fact that, to a worker on this side of the silver streak, Scott Archer to wit, belongs the honor of having introduced the collodion process, as it exists to-day, and in importance his discovery certainly ranks next to that of the daguerreotype. As he had not taken out a patent for his process, and the best thanks of photographers are due to him for this, our Government granted at his premature death a pension to his bereaved family, because he had been "the discoverer of a scientific process of great value to the nation, and from which the discoverer had reaped little or no benefit."

His collodion process then came extensively into use, as the results obtained by it, for studio work in general and portraiture in particular, were vastly superior to those of the daguerreotype. The substitution of glass for metal as a substratum was also a step in the right direction.

But even here photographers did not by any manner of means rest contented, for we find that a grand improvement was soon to take place in the introduction of gelatin as a substitute for the use of collodion, first proposed, after satisfying himself with experiment, by Dr. Maddox, and made practically and commercially successful by Mr. Kennet, of, strange to say, Maddox street.

Thus, speaking generally, we have at present three chief photographic processes, the daguerreotype, the collodion, and the one just mentioned, or the gelatin-bromide process.

The daguerreotype is still occasionally preferred for some special kinds of work, and the collodion process has its advantages, particularly in the production of "positives," but the introduction of the rapid gelatin dry plate, devoid of all the "messiness" of the old wet process, may fairly be said to have called the amateur photographer into existence and made him a striking feature of the nineteenth century.

The daguerreotype consists of a copper plate, which is first coated on one side with a very thin coat of metallic silver by electro deposition and then submitted to the combined action of bromine and iodine, thus forming silver bromo-iodide, a combination which has been proved by experiment to be much more sensitive to light than either of the separate single salts.

After exposure in the camera, the photographic image is developed by means of metallic mercury vapor, usually performed by heating a layer of mercury to about 150° Fahr., and suspending the plate over it, in the dark, or some non-actinic medium, of course, then finally fixed by a solution of thiosulphate of sodium.

Now, as regards the chemistry of this process, the first question that naturally presents itself is, What important change does the light produce on the sensitive surface of silver haloid salts when exposed to its influence? You will at once remember that this is the very problem Scheele tried so hard to solve, and to-day, although a century after, we have not yet arrived at a clear solution. This is possibly little matter for surprise when we consider that, to begin with, we do not know what light itself really is. Some theorists even argue that the light does not produce any chemical decomposition whatever, but merely a physical change. The açcepted theory, however, appears to be, and it receives the support of our best authority—Captain Abney—that a subsalt is formed thus:

$$Ag_2I_2+\text{light}=Ag_2I+I,$$

the free iodine combining with excess of silver present to form more silver iodide.

But then, on the other hand, no one has ever yet prepared a definite chemical compound of silver with any of the halogens, containing *less* of the latter than the ordinary chloride, bromide or iodide, and so the matter remains.

Accepting the subsalt theory, then, the development of the latent or photographic image is apparently due to the attraction of the sub-iodide for the mercury-vapor, the resulting visible image consisting of a white amalgam of mercury and silver, whilst in the process of "fixing" the thiosulphate simply dissolves away the unaltered iodide by forming a soluble double salt thus:

$$2AgI+3Na_2S_2O_3=Ag_2Na_4(S_2O_3)_3+2NaI.$$

Turning to the collodion process we find *glass* plates are used, coated on one side with collodion, containing in its solution a bromide and iodide, usually ammonium iodide and cadmium bromide, and as soon as it is "set," they are sensitized by immersion in a bath of silver nitrate, when double decomposition of course takes place in the film, silver bromide and iodide being formed. Whilst still in this moist state, they are exposed in the camera and, after exposure, a solution of ferrous sulphate, with the addition of a little acetic acid and alcohol, is used for their development; the reactions that take place whilst developing being oxidation of the ferrous salt to the ferric, and consequent reduction of the silver salts to the metallic state, the latter remaining insoluble in the film, and constituting the image, the acid contained in the developing solution merely acting as a restrainer to prevent the too rapid reduction of the silver salt, whilst the alcohol simply exercises a mechanical action in causing the solution to flow more evenly over the plate.

The reaction would, I think, be expressed by the following equation:

$$6Ag_2Br+6FeSO_4=Fe_2Br_6+2(Fe_23SO_4)+12Ag.$$

After washing they are then "fixed" by means of a solution of "hypo," which, as before, merely dissolves out the unaltered iodide and bromide of silver.

(*To be continued.*)

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, December 18, 1888.

The meeting was called to order and Mr. Wm. McIntyre was asked to preside. The minutes of the last meeting were read and approved.

Professor Trimble stated that at the last meeting of the College Committee upon revision of the pharmacopœia the question of the strength of *bleaching powder* was discussed, and it was thought by some that the statement of our standard was much lower than the character of the chlorinated lime of commerce warranted. Mr. H. J. M. Schroeter, a post graduate of our School, at Professor Trimble's suggestion, made a number of determinations of the amount of chlorine in various lots he had obtained from various stores, and found an average would be rather over twenty-nine per cent; he read a paper giving the results of his assays.

Professor Maisch stated that while this subject was under consideration in the Revisional Committee it was well known that much stronger chlorinated lime could be obtained in large quantities; but it was thought best to adopt a minimum percentage of 25 because the substance was quite liable to lose chlorine and such a grade could be readily secured by the pharmacist. Prof. Maisch inquired if that contained in small packages was uniform in strength and as strong as that taken from the large casks; the article imported in the casks was very well preserved.

Mr. Meyer asked if the sales of chloride of lime were not less than formerly. He was of the opinion that it was; but several thought that the sales were more frequent. It was stated that all chorinated lime consumed here was of foreign manufacture as the black oxide of manganese of American origin is inferior to that which is imported. A query was put whether the manganese ores were contaminated with cobalt; to this answer was made that they were rarely found together.

Mr. England read a paper upon a *permanent syrup of hydriodic acid.* Professor Maisch asked Mr. England if he had tested the pharmacopœial syrup for glucose; he said that he had not done so. Mr. Beringer said he had made syrup of hydriodic acid by the double decomposition of potassium iodide and crystallized tartaric acid, but that he had added some sugar to the solution of potassium iodide to prevent change, and he found the syrup had kept well since August, 1887.

Professor Trimble reminded the meeting that last month he read a paper upon a berry used as food. At this meeting he would call attention to a root, which was largely used for nutrient purposes, obtained from *Lewisia rediviva.* It was generally stripped of its bark and contained a large amount of mucilage.

Mr. McIntyre remarked that as some of the members were going to cross the Rocky mountains for the next meeting of the American Pharmaceutical Association, they should bear this root in mind; if they should run short of provisions and had to forage it would be a novel experience.

Mr. England inquired about the *loco-weed* of the Western States; some parties had stated that it was particularly poisonous to cattle, while others thought such was not the case. Prof. Maisch stated that the experiments upon the subject made by preparing infusions, tinctures and extracts failed to show any specially poisonous properties, and Professor Sayre had been unable to find in the plant any deleterious principle; but the physiological experiments had been made upon carnivorous and omnivorous and not with herbivorous animals. The American loco weeds were species of the genera astragalus and oxytropis, and were botanically closely rlated to the shrubs of Western Asia yielding tragacanth.

Mr. G. M. Beringer read a paper upon the *Hungarian Daisy*, an importation of which had been made into New York, and which was likely to be used as an adulteration of the insect powder. Prof. Maisch suggested that since the microscope seemed to afford no reliable criterion for the detection of such an adulteration in insect powder, the percentage of alcoholic extract and of ash, as determined by Mr. Beringer, might be made available for this purpose.

The papers read, having been referred to the Committee on Publication, there being no further business, the meeting adjourned.

T. S. Wiegand,
Registrar.

PROCEEDINGS OF STATE PHARMACEUTICAL ASSOCIATIONS.

The following printed Proceedings have been received of meetings which have been previously reported in the last volume of the Journal:

Illinois.—Pp. 207. See November number, 1888, p. 587.

Massachusetts.—Pp. 225. See July number, 1888, p. 377.

Minnesota.—Pp. 140. See August number, 1888, p. 425.

Missouri.—Pp. 238. See August number, 1888, p. 426.

South Dakota.—Pp. 82. See November number, 1888, p. 587.

Wisconsin.—Pp. 72. The meeting was held at Palmyra Springs, August 7–10th, president Pulford in the chair. The president's address, the reports of officers and various committees, and eight essays on different subjects claimed the attention of the meeting. The officers for the present year are J. C. Huber, Fond du Lac, president; H. Rollman, Chilton, and F. W. Isham, Elkhorn, vice-presidents; E. B. Heimstreet, Janesville, permanent secretary; W. P. Clarke, Milton, treasurer; W. M. Edwards, Portage, local secretary. The tenth annual meeting will be held at Portage during the second week in August next, commencing Tuesday and lasting three days.

EDITORIAL DEPARTMENT.

The new volume of the Journal, commencing with the present number, bears upon its title page—in addition to the names of the members of the Publishing Committee, under whose supervision the Journal has been issued since the death of Professor Procter in February, 1874—also the names of a number of gentlemen well known to the pharmacists of the country, who as "collaborators" will hereafter identify themselves with the Journal even more closely than in the past.

In closing the eighteenth year as occupant of the editorial chair and the thirty-fifth year as one of the contributors to the pages of the Journal, the Editor desires to thank his many friends for their uniform courtesy in the past, and with his best wishes towards all at the beginning of the present year, to request a continuance of their favorable interest in the Journal.

The next meeting of the American Pharmaceutical Association.—We are informed by the chairman of the Committee on Arrangements, Prof. Emlen Painter, New York, that the Committee has not made, or authorized the publication of any statement concerning arrangements for the trip to California. The date of the meeting has not yet been fixed, but will probably be either June 24th or July 15th, and members are requested to communicate their preference to the chairman without delay. It is contemplated to give a through rate at the least possible expense, and to make the side excursions entirely optional. The announcement of the date and of the plan for the trip to California will be communicated, over the signatures of the Committee, in time for publication in the February issues of the Pharmaceutical Journals.

The Manufacture of Fuid Extracts by Retail Pharmacists is the theme upon which essays have been invited by the Anderson Manufacturing Company, Detroit, Michigan. The essays are not to exceed in length 1000 words, and are to be sent by March 1st next to P. O. box 134, Detroit. It is expected that the professional as well as the financial advantage of such manufacturing be discussed, and that as much as possible the results obtained in actual work be given, and not mere theorizing or excerpts from the work of others. A committee of three pharmacists will decide upon the merits of the essays received, and award the two prizes, consisting of percolation apparatus.

Rewards for meritorious discoveries and inventions.—The Franklin Institute of the State of Pennsylvania, through its Committee on Science and the Arts, is empowered to award, or to recommend the award of, the following medals:

1. The Elliott Cresson Medal (gold), founded by legacy of Elliott Cresson, will be granted for the invention or improvement of some useful machine, or for some new process, or combination of materials in manufactures, or for ingenuity, skill or perfection in workmanship.

2. The John Scott Legacy Premium and Medal ($20 and a medal of copper) originated from a bequest made in 1816 by John Scott, a merchant of Edinburgh, Scotland, to the city of Philadelphia, for rewarding ingenious men and women who make useful inventions.

Upon request therefor, from interested parties, made to the Secretary of the Franklin Institute, at Philadelphia, full information will be sent respecting the manner of making application for the investigation of inventions and discoveries; furthermore, the Committee on Science and the Arts will receive and give respectful consideration to reports upon discoveries and inventions, which may be sent to it with the view of receiving one or the other of the awards herein-named, and full directions as to the manner and form in which such communications should properly be made, will be sent on application.

The Universal Exposition of 1889 *at Paris*, France, will open May 5th, and close October 31st; and goods for exhibition will be received from January 1st to March 31st. The United States Commission, having its home office at No. 1 Broadway, New York, and its Paris office at No. 27 Avenue de la Bourdonnais, will forward free of freight between New York and the Exposition, going and returning, all articles received for exhibit.

The classes in which pharmacists and druggists are specially interested are in group II.: 8. Organization, methods and appliances for higher instruction; 12. photographic proofs and apparatus; 14. medicine and surgery; veterinary and comparative medicine; 15. instruments of precision. In group III.: 28. perfumery. In group V.: 45. chemical and pharmaceutical products; 46. chemical methods of bleaching, dyeing, printing and finishing. In group VI.: 51. apparatus used in chemistry, pharmacy and tanning. In group VII.: 67. cereals; farinaceous products with their derivatives.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Several important works remain upon the Editor's table, for the review of which we hope to make room in our next issue. The following reports, essays and periodical publications have been received:

The Physician's Visiting List (Lindsay & Blakiston's) for 1889. Philadelphia: P. Blakiston, Son & Co.

The one before us is the thirty-eighth annual issue.

Methods of Analysis of Commercial Fertilizers, Cattle Food, Dairy Products, Sugar and Fermented Liquors; adopted at the fifth annual convention of the Association of Official Agricultural Chemists, held at the U. S. Department of Agriculture, August 9 and 10, 1888. 8 vo., pp. 96.

This is Bulletin No. 19, Division of Chemistry.

Vergleichung der wichtigsten narkotischen Extracte. Inaugural-Dissertation von Richard Kordes.

A resume of Mr. Kordes' work upon the narcotic extracts was given in our last volume pp. 402, 452, and 559.

Beiträge zur Toxikologie des Ortho-und Para-Toluidin. Inaugural-Dissertation von B. A. Treitenfeld, Dorpat. 8 vo., pp. 37.

Contributions to the toxicology of ortho-and para-toluidin.

Compendium of the Laws Relating to Public Health and Safety of the State of Pennsylvania, together with the decisions of the Supreme Court and County Courts relating thereto. Compiled for the State Board of Health, Harrisburg. 8 vo., pp. 174.

Report of the Pennsylvania State College for the year 1887. Part II. Agricultural Experiment Station. 8 vo., pp. 226.

Mineral and Thermal Springs of California. By W. F. McNutt, M. D., etc.

From the Transactions of the Ninth International Medical Congress. Vol. V.

Below Sea-Level; nature's pneumatic cabinet; and *High Altitudes of Southern California.* By Walter Lindley, M. D., Los Angeles.

Two papers on the extremes in altitude in Southern California, reprinted from the *Medical Record,* and *Southern California Practitioner.*

The preferable climate for Phthisis, or the comparative importance of different climatic attributes in the arrest of chronic pulmonary diseases. By Chas. Denison, A. M., M. D., &c., Denver.

From the Transactions of the Ninth International Medical Congress, Vol. V.

Writing Machines for Doctors. By John Aulde, M. D.; reprint from The Medical Register, Philadelphia.

A new Antiseptic. By D. W. C. Wade, M. D., Holly, Michigan.

The antiseptic recommended is *aluminium sulphite.*

The failure of Dr. J. B. Thomas' Treatment of Urethral strictures by electrolysis. By Rob. Newman, M. D., New York.

From the Journal of the American Medical Association.

Displacements of the Uterus; together with formula for official dilute hydrobromic acid, U. S. P. By DeWitt C. Wade, M. D., Holly, Michigan.

From the Transactions of the Ninth International Medical Congress, Vols. II. III.

Is the average Dentist of to-day a specialist in medicine? By B. H. Catching, Louisville, Ky.

Address delivered before the joint meeting of the American and Southern Dental Associations.

Zusammenstellung der Arbeiten über das Antipyrin.

Compilation of the papers on antipyrine.

A digest of the more important publications on Sulfonal-Bayer.

Phenacetine-Bayer (Para-Acetphenetidine).

The above three pamphlets contain resumes of most publications relating to the properties of the three chemical specialties named in the titles. The last two are published by W. H. Schieffelin, & Co., New York.

Transactions of the American Association of Obstetricians and Gynecologists at the first annual meeting, held in Washington, D. C., Sept. 18, 19 and 20, 1888. Abstract. 8vo. pp. 38.

Reprint from the Buffalo Medical and Surgical Journal.

Second Annual Report of the State Board of Health and Vital Statistics of the Commonwealth of Pennsylvania. Transmitted to the Governor December 1, 1886. Harrisburg. 8vo. pp. 1056.

The publication of the first annual report of this Board was noticed on page 622 of our volume for 1886. The publication of the volume now before us was delayed in consequence of the printing of the reports of other departments having been previously authorized by the Legislature and therefore, taken precedence.

The report of the Secretary, Dr. Benj. Lee, and the minutes of the Board occupy only a small portion of this stately volume. By far the greater portion is taken up by special reports, essays, statistics, etc., all of which appear to have been prepared with much care. Thus we find reports on water supplies and drainage of different localities; on local epidemics and special sources of disease; on quarantine and disinfection; mortuary tables; various legal proceedings; an account of the State Sanitary Convention, with the papers read before that body; the proceedings of the National Conference of State Boards, etc.

The care bestowed upon the preparation of this volume reflects credit upon the Board and its secretary, and it is to be hoped that in the future the Legislature may, more promptly than heretofore, take action for the early publication of such reports.

CLASSES

—OF THE—

PHILADELPHIA COLLEGE OF PHARMACY,

SIXTY-EIGHTH ANNUAL SESSION, 1888-1889.

JUNIOR CLASS.

Name.	*Place.*	*State.*	*Preceptor.*
Alsentzer, Chas. Frederick,	Wilmington,	Del.	F. R. Smith.
Adams, Franklin Irving,	Amsterdam,	N. Y.	J. H. Barkhuff, Ph. G.
Allen, Bert William.	Groton,	N. Y.	C. Shivers.
Angeny, Ferdinand Gisler,	Doylestown,	Pa.	Harland Cloud, Ph. G.
Appel, Albert Alphonso,	Hamburg,	Germ'y.	G. W. Goldsmith.
Apple, Franklin Muhlenburg,	Bangor,	Pa.	M. L. Apple.
Appman, William,	San Antonio,	Tex.	F. Kalteyer & Son.
Armstrong, Eugene Curtis,	Chester,	Pa.	A. Steen Buchanan.
Bacon, Henry Augustus,	Burlington.	N. J.	H. B. Weaver, Ph. G.
Barnard, Wm. Dwight,	Manistee,	Mich.	A. H. Lyman.
Barwig, Gustavus Adolphus,	Philadelphia,	Pa.	Dr. G. A. Bachman.
Baskin. Mortimer Horning,	Harrisburg,	Pa.	M. H. Bickley.
Bast, Charles Lewis,	Baden,	Germ'y.	N. A. Cozens, Ph. G.
Behm, John Strickler,	Derry Church,	Pa.	James Buckman, Ph.G.
Belt, James Ferris,	Wilmington,	Del.	Z. James Belt.
Besore, Abraham Lincoln,	Shippensburg,	Pa.	W. D. E. Hayes.
Bilderback, Joseph Brown,	Pennsgrove,	N. J.	Dr. M. Johnson.
Blackwood, Russell,	Bristol,	Pa.	J. R. Smyser, Ph. G.
Bloor, Frank William,	Mansfield,	Ohio,	McCullough & Caldwell.
Böcking, Guido Carl,	Tyrone,	Pa.	Sam'l Gerhart, Ph. G.
Bonnell, Alex. Carhart,	Clinton,	N. J.	B. F. Severs, M. D.
Bowman, Fred Kyle,	Decatur,	Ill.	G. W. Thompson.
Bowman, George McLeod,	Bridgeton,	N. J.	C. B. Bellows, Ph. G.
Bowman, John McLaughlin,	Philadelphia,	Pa.	F. W. Heyl, Ph. G.
Bradbury, Wymond H.	Hammondton,	N. J.	A. W. Cochran.
Breidinger, Lewis Abraham,	Easton,	Pa.	C. E. Hewitt, Ph. G.
Breisch, William H.	White Haven,	Pa.	C. M. Driggs.
Brittain, John,	Butler,	Pa.	J. C. Redick.
Brown, Charles,	Philada.,	Pa.	W. J. Pechin.
Brown, Thomas Edward,	Seaford,	Del.	P. W. Tomlinson, M.D.
Buehl, Edward Hermann,	Massillon,	Ohio.	E. S. Craig, Ph. G.
Bugg, Zack W.,	Blandville,	Ky.	S. J. Coffee, Ph.G.
Burgess, Ellis Beaver,	Pittsburg,	Pa.	D. C. Aughinbaugh.
Burgess, Frank Eugene,	Jefferson,	Ohio.	E. H. Evans.
Cadmus, Alfred Brooks,	Philada.,	Pa.	Bullock & Crenshaw.
Caffrey, James Peter,	Wilkesbarre,	Pa.	F. F. Donnell.
Carney, George Elmer,	Philada.,	Pa.	Hance Bros. & White.
Carriat, Louis Michael,	Egg Harbor City.	N. J.	
Carter, James Royal,	Lincoln.	Neb.	Zehrung & Dunn.
Casey, Harry English,	Philada.,	Pa.	Bullock & Crenshaw.
Chapman, Mrs. Emily J.,	Philada.,	Pa.	W. C. Sparks.

Name.	*Place.*	*State.*	*Preceptor.*
Christman, Albert S.,	Allentown,	Pa.	E. J. Danowsky.
Coleman, Samuel,	Harrisburg,	Pa.	Dr. L. A. Dix.
Cook, Francis Wade,	Royersford,	Pa.	M. H. Bickley.
Cornogg, Samuel Sharpless,	Ward,	Pa.	L. C. Buckley.
Craig, Cornelius Abernathy,	Pulaski,	Tenn.	Craig & McLemore.
Crothers, James Lawson,	Zion,	Md.	W. H. Lantz.
Cullen, James Kimmey,	Camden,	Del.	F. H. Davis.
Dalton, David,	Upland,	Pa.	E. A. Trist, Ph.G.
Dalton, William Spencer,	Highpoint,	N. C.	Porter & Dalton.
Davis, Alvah Molony,	Norristown,	Pa.	E. A. Stahler,
Deibert, Wm. Henry,	Stemton,	Pa.	Harry Swain, Ph G.
Dennison, Jr., Edward Lyman,	Marion,	Ill.	E L. Dennison, M. D.
Devine, Oliver Crawford,	Philada.,	Pa.,	D. McVicker.
Dewees, Jacob Highley,	Norristown,	Pa.	Wm. Stahler.
Dice, Will,	Mansfield,	Ohio,	W. M. Barton.
Dierolf, Charles B.,	Mount Joy,	Pa.	Dr. J. F. Meade.
Dillon, Jr., Thomas Henry,	Philada.,	Pa.	Dr. Jos. Malatesta, Ph.G.
Dubbs, Robert Lorine,	Allentown,	Pa.	L. Murjahn.
Duff, Peter Nicholas,	Philada.,	Pa.	S. Campbell, Ph.G.
Dunning, Fred,	Denton,	Md.	E. Q. Thornton.
Dunwiddie, Wm. Arthur,	Phillipsburg,	Pa.	J. M. George.
Dunwody, Richard Gaillard,	Brunswick,	Ga.	Dr. J. A. Dunwody.
Eberhardt, Wm. Frederick,	Fond du Lac,	Wis.	Ditter, Mitchell & Co.
Eby, Edwin Stanton,	Newport,	Pa.	B. M. Eby.
Eckels, Chas. Alfred,	Mechanicsburg,	Pa.	H. S. Eckels, Ph.G.
Elliott, Arthur Hugh,	Mansfield,	Pa.	C. V. Elliott, M. D.
England, Wm. Taws,	Philada.,	Pa.	R. England, Ph G.
Eppley John Hake,	York,	Pa.	W. K. Mattern, M. D., Ph.G.
Evans, Paul Whiting,	Malvern,	Iowa,	Munger & Goodwin,
Eyer, Harvey Bowman,	Everett,	Pa.	C. G. Masters.
Feidt, George David,	Hagerstown,	Md.	H. H. Ross.
Flemming, Thomas Francis,	Reading,	Pa.	Ziegler & Smith,
Fletcher, Tom Milton,	Little Rock,	Ark.	W. H Haliburton.
Flora, George Elwood,	Bangor,	Pa.	Dr. J. Buzzard.
Fraunfelder, Richard Deily,	Easton,	Pa.	Dr. T. N. Reeser.
French, Adelbert Porter,	Susquehanna,	Pa.	H. E. Outwater.
Frontz, Edward Elmer,	Hughesville,	Pa.	W. C. Stillwell, M. D., Ph.G.
Garcia, Juan Reyes,	Porto Rico,		R. C. Martin.
Garland John Kisler,	Scranton,	Pa.	N. G. Ritter, Ph. G.
Geilfus, Alfred Victo,	Philadelphia,	Pa.	F. T. Williams, Ph. G.
Gervais, Wm. Joseph,	Elmira,	N. Y.	J. R. Angney, M. D.
Gibble, Elmer Ellsworth,	Manheim,	Pa.	J. Howard Evans.
Gibbony, David Clarence,	Lisbon,	Iowa,	S. Kittering.
Gibson, Robert,	Shepherdstown,	W. Va.	O. H. Musser, Ph. G.
Gonzales, José Antonio,	Cucuta,	Columbia, S. A.	
Gordon, Jean,	Cincinnati,	Ohio.	Dr. S Hayhurst.
Gosh, Wm. Edgar,	Danville,	Pa.	W. E. Meck.
Gottwerth, Wm. Louis,	Wilmington,	Del.	T. B. Cartmell.
Gotwalt, Sam'l. Horace,	York,	Pa.	J. H. Stermer, Ph. G.
Graham, Harry Clyde,	Waterbury,	Ct.	J. M. Hillan.
Griffith, Joseph Thomas,	Sassafras,	Md.	F. E. Harrison, Ph.G.
Groody, Thomas Joseph,	Centralia,	Pa.	J. M Hillan.
Guest, Harry,	Sweedesboro,	N. J.	C. C. Hughes.
Hackenberger, G. Washington,	Bainbridge,	Pa.	H. C. Blair's Sons.
Hæberle, Louis Philip,	Philada.,	Pa.	A. Hohl, Ph. G.
Hall, Thomas Murphy,	Middletown,	Del.	H. Knight, Ph. G.
Hamberg, Samuel T.,	Pittsburg,	Pa.	J. F. Judd.
Hand, Harry Cobb,	Cape May, C. H.,	N. J.	
Hanson, Arthur Edward,	Rio Janeiro,	Brazil,	J. J. Ottinger, Ph. G.
Harbold, Curtis Alexander,	York,	Pa.	J. M. Ruegenberg.

Name.	*Place.*	*State.*	*Preceptor.*
Harris, William Petriken,	Mill Hall,	Pa.	W. J. Shoemaker.
Hasson, Henry Decora,	Philipsburg,	Pa.	D. H. Ross, Ph. G.
Haydock, Susannah Garrigues,	Philada.,	Pa.	S. Hayhurst, M. D.
Hendrickson, Chas. Palmatary,	Dover,	Del.	J. H. Buckingham, Ph.G.
Henkel, Luther Samuel,	Catawissa,	Pa.	E. H. Baker, Ph. G.
Hennessy, Frank Augustine,	Charlotte,	Mich.	H. K. Mulford, Ph. G.
Herbein, George Winters,	Sinking Springs,	Pa.	H. G. Haring.
Herr, Henry Eastburn,	Masonville,	N. J.	H. A. Borell, Ph. G.
Hickman, Thomas Elwood,	Lombard,	Md.	W. H. Hickman, M.D.
Hills, Daniel Henry,	Jamestown,	N. Y.	Wilmot Hansell.
Hood, John Ezekiel,	Smithfield,	N. C.	T. R. Hood.
Hornby, Walter Melvin,	Roxborough,	Pa.	H. H. Anderson.
Hurxthal, Henry Lewis,	Massillon,	Ohio.	E. A. Richmond, Ph.G.
Irvin, James Scales,	Reidsville,	N. C.	Irvin Bros.
Jackson, Henry Spencer,	Barnsley,	Pa.	Dr. C. P. Jackson.
Jacob, Walter William,	West Grove,	Pa.	Genois & Laubach.
Janson, Edwin Leonard,	Canton,	Ohio,	Weber Bros.
Johnson, Wm. Anthony,	Philada.,	Pa.	E. Jungmann, Ph. G.
Karcher, James Daniel,	Millville,	N. J.	Dr. T. C. Wheaton.
Keim, Albert Frederick,	Chillicothe,	Ohio,	J. A. Nipgen.
Keller, Benjamin C.,	Manchester,	Iowa,	L. Atwater & Son.
Keppler, Charles Lewis,	New Orleans,	La.	C. L. Keppler.
Ketterer, Martin,	Philada.,	Pa.	J. C. Phillips.
Kitzmiller, Frank Kurtz,	Harrisburg,	Pa.	M. Campbell, Ph. G.
Kogelschatz, John Wm.,	Martinsburg,	W. Va.	J. Barclay Hall.
Koons, Milton Henry,	Catasauqua,	Pa.	E. D. Boyer. Ph. G.
Krauss, Frederick,	Philada.,	Pa.	Geo. Bille, Ph. G.
Kunkle, Wm. Henry,	Salladasburg,	Pa.	W. E. Kunkle.
Laessle, Henry Adolph,	Philada.,	Pa.	Dr. F. Seitz.
Lammer, Jacob Sigmund,	Philada.,	Pa.	Bullock & Crenshaw.
Landis, Charles Paul,	Philada.,	Pa.	Chris. Petzelt.
Landis, Gilbert Cromie,	Camden,	N. J.	F. Phillips.
Landon, Francis P.,	Wilmington,	Del.	F. W. Fenn.
Lefferts, Henry Tomlinson,	Southampton,	Pa.	Given & Co.
Leigh, Charles Neal,	Coxsackie,	N. Y.	H. C. Manlove.
Lingle, Milton David,	West Hanover,	Pa.	Dr. W. C. Kline.
Linsz, Henri Philip,	Tioga,	Pa.	
Lippen, Jonathan Knight,	Salem,	N. J.	H. M. Levering, Ph.G.
Lisenring, Gibson Harry,	Chester,	Pa.	J. F. Fielding.
Lloyd, James E.,	Northumberland,	Pa.	Dr. W. L. Palmer.
Loelkes, Alexander George,	Belleville,	Ill.	Aschenbach & Miller.
Loesch, William,	Philada.,	Pa.	W. E. Lee, Ph. G.
Long, Christian Leitner,	Shippensburg,	Pa.	T. E. Conard, M. D.
Lutz, Irwin Breneman,	Blainesport,	Pa.	C. M. Steinmetz, Ph.G.
Lutz, Wm. Dellet,	Germantown,	Pa.	L. A. Treichler.
McAniff, Hugh Phillips,	Wilkesbarre,	Pa.	Joseph Hart.
McArthur, Edward Duncan,	Georgetown,	Col.	
McClellan, Howard,	Cambridge,	N. Y.	H. G. South.
McClure, Linwood Dunham,	Philada.,	Pa.	Budd Butterworth & Co.
McCorkle, Wm.,	Philada.,	Pa.	H. Moll & Co.
McCullough, Madison Lovett,	Oxford,	Pa.	C. B. McCullough.
McDonald, Claud Duval,	Norfolk,	Va.	W. F. Phillips.
Mackey, Edward Scudder,	Belvidere,	N. J.	Faust Bros
McNabb, Henry Steel,	Belleville,	N. J.	J. T. Shinn, Ph. G.
Marvill, Joseph Howard,	Philada.,	Pa.	J. F. Yealy, Ph. G.
Mayes, Thomas Enoch,	Lewistown,	Pa.	J. A Muthersbough, Ph.G.
Mentzer, Harlan Joseph,	Waynesboro,	Pa.	T. L. Buckman, Ph.G.
Meyers, Louis,	Conshohocken,	Pa.	C. Moylan.
Meyers, Quillas Albert,	Petersville,	Pa.	Stewart M. Hohl.
Miller, Frank,	Danville,	Pa.	W. E Meck.

Name.	*Place.*	*State.*	*Preceptor.*
Miller, William Edward.	Camden,	N. J.	H. W. Miller.
Miller, William Haman,	Dover,	Del,	S. D. Marshall.
Milliken, William Houston,	Philada.,	Pa.	H. S. Eckels, Ph. G.
Moon, Joakin Richard.	Morrisville,	Pa.	F. C. Pryor.
Moore, Wm. David,	Connellsville,	Pa.	J. C. Moore.
Morales, Guadalupe,	Nicaragua,	C. A.	D. Morales.
Morrison, John William,	Amherst,	N. S.	R. C. Fuller.
Moylan, Wm. Henry,	Philada.,	Pa.	T. C. Tomlinson.
Mueller, Charles August,	Philada.,	Pa.	A. G. Keller, Ph. G.
Mulheron, John Dunaway,	Brownsville,	Tenn.	J. H. Owen.
Mustard, Frank Haveling,	Philada.,	Pa.	H. F. Roades.
Myers, William Tice,	Myerstown,	Pa.	C. C. Hagenbuch.
Newton, Alexander Bunyan,	Philada.,	Pr.	J. L. Kooker, Ph. G.
Nickum, Elwood George,	Bethlehem,	Pa.	C. B. Lowe & Co.
Odbert, James Henry,	Wheeling,	W. Va.	A. T. Young
Outen, Albert Pettit,	Philada.,	Pa.	Danl. Follmer.
Pazmino, Francisco,	Machala,	Ecuador, S. A.	
Peacock, Josiah Comegys,	Millington,	Md.	J. W. Kohlerman, Ph.G.
Pentz, John Fleming,	Easton,	Pa.	H. B. Sample & Son.
Perkins, John Seymour,	Clarksville,	Tenn.	Asken & Edwards.
Perry, John Conrad,	Philada.,	Pa.	John Roper.
Pfromm, Geo. Washington,	Philada.,	Pa.	D. S. Wiltberger.
Phipps, Amos Joseph,	Chestnut Hill,	Pa.	F. H. Poley.
Plass, Hermann.	Germantown,	Pa.	M. Kratz. Ph. G.
Platt, George Fisk	Chambersburg,	Pa.	H. A. Newbold, Ph. G.
Prass, John Nicholas,	Dayton,	Ohio,	W. H. Hyers,
Pratt, Wm. Henry,	Camden,	N. J.	Lewis H. Wilson.
Prior, Edwin Alfred,	Williamsport,	Pa.	M. Huber.
Prizer, Sue Ada,	Pottstown,	Pa.	Dr. Roney.
Procter, James Elliot,	Wooster,	Ohio,	A. W. Blackburn.
Rasmusen, Otto,	River Falls,	Wis.	C. E. Davis.
Raub, Fred Miller Dickson,	Lancaster,	Pa.	Dr. M. W. Raub.
Reese, David John,	Scranton,	Pa.	C. Carroll Meyer, Ph. G.
Reizenstein, Albert George,	Lebanon,	Pa.	Dr. Geo. Ross & Co.
Remington, Samuel Jacobs,	Philadelphia,	Pa.	Stryker & Ogden.
Rhodes, Charles Reynolds,	Orrstown,	Pa.	W. H. Faunce Ph. G.
Richardson, Harry,	Dover,	Del.	C. E. Hewitt, Ph. G.
Richardson, James Henry,	Charlestown,	Md.	Dr. L. R. Kirk.
Rohrer, Howard,	Lancaster.	Pa.	H. B. Cochran.
Rolph, Wilbur Hamilton,	Church Hill,	Md.	Lee Roberts.
Ross, Evan Jackson,	Phœnixville,	Pa.	Geo. Cooke.
Ross, H. Frank,	Russellville,	Pa.	T. G. Pierce.
Roth, Theodore Wm.	Philadelphia,	Pa.	Dr. G. H. Ischler.
Rue, Louie Evans,	Danville,	Ky.	Caldwell & Eastland.
Ruff, U. Gilbert,	Bryansville,	Pa.	J. H. Munson, Ph. G.
Sample, Joseph Frank,	Mechanicsburg,	Pa.	J. H. Shelly.
Sanborn, Francis P.,	Wilmington,	Del.	F. W. Finn.
Schade, George Julius,	Sandusky,	Ohio,	O. F. Johnson.
Scheirer, Franklin Benjamin,	Hokendauqua,	Pa.	F. N. Green.
Scheirer, Victor Daniel,	Allentown,	Pa.	Weber & Good.
Scherer, Bernhard Frederick,	Philadelphia,	Pa.	C. E. Haenchen.
Schick, Frederick Martin,	Bellair,	Ohio,	J. D. Van Law.
Schoff, Jacob John,	Annapolis,	Md.	G. B. Evans, Ph. G.
Schraedley, Fred'k Abraham,	Locust Dale,	Pa.	Bullock & Crenshaw.
Schultz, Albert,	Scranton,	Pa.	T. D. Lewis.
Seler. Charles Augustus,	Allentown,	Pa.	D. Heistand.
Shaffer, Samuel Albert,	Lock Haven,	Pa.	G. W. Mason.
Sheafer, Edward Parke,	York,	Pa.	J. L. Supplee, Ph. G.
Sheehan, John Peter,	Utica	N. Y.	W. R. Jones.
Shimer, Edwin Babp,	Stockerton,	Pa.	Dr. Fetterolf.

Name.	*Place.*	*State.*	*Preceptor.*
Shivers, Stockton Spicer,	Camden,	N. J.	Dr. C. L. Mitchell.
Shomberg Albert Frederick,	Altoona,	Pa.	G. A. Beckley.
Sipe, George Walter,	Carlisle,	Pa.	G. D. Keller, Ph. G.
Smith, Charles Oscar,	Hartleton,	Pa.	Dr. Muench.
Smith, Clyde Austin,	Lewisburg,	Pa.	C. B. Griffin.
Smith, Fred Harlow,	Springfield,	Mass.	H. & J. Brewer.
Smith, Gilbert Slack,	Goshen,	N. J.	Dr. A. N. Tomlin.
Smith, Henry Clay,	Millville,	N. J.	Dr. W. H. C. Smith.
Smith, Marvin Carter,	Newark,	N. J.	Chas. Henwood.
Solliday, Wm. Walter,	South Easton,	Pa.	A. Spengler.
Sombart, Joseph Louis,	Coldwater,	Kansas,	J. E. Sombart.
Sontag, George Lewis,	Neillsville,	Wis.	C. C. Sniteman, Ph. G.
Spragle, Elmer,	Bartonsville,	Pa.	G. W. B rton.
Sprissler, Clara,	Philadelphia,	Pa.	Dr. Theo. Sprissler, Ph. G.
Spruance, James Harvey,	Smyrna,	Del.	O. C. Spear, Ph. G.
Stanger, Lawrence Albertson,	Philadelphia,	Pa.	O. H. Sterner.
St ngl, Paul Louis,	Berlin,	G'rm'y.	A. Stangl, Ph. G.
Steiner, Ephraim Henry,	South Easton,	Pa.	A. N. Richards, Ph. G.
Stewart, Abraham Lincoln,	Newtown,	Pa.	J. R. Elfreth, Ph. G.
Stimmel, Walter,	Wilmington,	Del.	P. Steelman.
Stirling, David Clayton,	Philadelphia,	Pa.	J. W. Horner, Ph. G.
Stout, Oliver,	Philadelphia,	Pa.	J. L. Supplee, Ph. G.
Strohecker, Samuel Martin,	Reading,	Pa.	J. B. Raser, Ph. G.
Stroud, John Geary,	Port Providence,	Pa.	W. S. Higbee.
Sullivan, Charles Edwin,	Gettysburgh,	Pa.	J. M. Griffin.
Swainbank, Harry Harlan.	Wilkesbarre,	Pa.	Nat. Wolfe & Co.
Taggart, George Corson,	Norristown,	Pa.	A. Yeakle.
Taylor, Harry Baker,	Altoona,	Pa.	E. L. Taylor.
Thompson, Charles Leonard,	Wilmington,	Del.	J. M. Harvey.
Thompson, Wm. Franklin,	Harrisburg,	Pa.	P. W. Houck.
Thomson, Frank Frazer,	Carlisle,	Pa.	
Tinsman, John Fine,	Bloomsburg,	N. J.	A. J. Odenwelder.
Troutman, George Franklin,	Glenn Riddle,	Pa.	Dr. C. L. Lashelle, Ph. G.
Turner, Herbert Wilkinson,	Altoona,	Pa.	C. F. Randolph Ph. G.
Tyler, George Cone,	Bristol,	Pa.	Emlin Martin.
Uhler, Samuel Elliott,	Carlisle,	Pa.	J. E. Sipe.
VanDyke, Alfred Nelson,	VanDyke,	Pa.	E. V. Pechin, Ph. G.
Van Valzah, John Adams,	Camden,	N. J.	W. D. Heiser.
Venn, Joseph,	Memphis,	Tenn.	J. Goldbaum.
Visanska, Saml. A.,	Abbeville,	S. C.	Given & Co.
Wallace, Harlan Lewis,	Seaford,	Del.	W. F. Haines.
Watson, Hite,	Charlestown,	W. V.	G. T. Light.
Weiler, John Wilson.	Emaus,	Pa.	H. B. Taylor, Ph. G.
Weiss, Frederick Andrew,	Del Norte,	Col.	Weiss, Chapman Drug Co.
Welsh, Oscar Connor,	York,	Pa.	Dale, Hart & Co.
Wescott, Wm. Carter,	Atlantic City,	N. J.	E. S. Reed.
Wetzler, Geo. Washington,	Van Dyke,	Pa.	Geo. W. Ewing.
Whilt, John Henry,	Philada.,	Pa.	J. R. Landis.
Wilbert, Martin Inventius,	Utica,	N. Y.	G. W. Shingle.
Williams, Daniel Albert,	Plymouth,	Pa.	B. Armstrong.
Williams, John Henry,	Slatington,	Pa.	W. H. Reed.
Wishart, John Elmer,	Harrisonville,	Pa.	J. B. Ferguson.
Wittel, John Kaler,	Florin,	Pa.	Leidy Seipel.
Wolfenden, Benj. Franklin,	Upland,	Pa.	Wm. Procter, Jr. Co.
Woodall, Junius P.,	Smithfield,	N. C.	C. E. Spencely.
Woods, John,	Philada.,	Pa.	H. L. Woods, M. D.
Yarnall, John Winters,	Mt. Carmel,	Pa.	Geo. E. Dahis, Ph. G.
Yeager, Tilghman Wesley,	Camden,	N. J.	J. B. Moore.
Zimmerman, Robt Emil,	Neillsville,	Wis.	H. J. Youmans.
Zulick, Albert Augustus,	Schuylkill Haven,	Pa.	W. D. Reynolds, Ph. G.

SENIOR CLASS.

Name.	*Place.*	*State.*	*Preceptor.*
Amsden, Wm. Cummings,	Manchester,	Iowa.	L. Atwater & Son.
Arny, Harry Vin,	New Orleans,	La.	F. C. Godbold.
Aubley, Samuel,	Scottdale,	Pa.	J. M. McNeil.
Ayers, William Bishop,	Salisbury,	Md.	Lewis & Ward.
Barnes, Frank Albert,	Philadelphia,	Pa.	Dr. John Marshall.
Barnitz, Lincoln Gray,	Catawissa,	Pa.	G. W. Roland, Ph. G.
Barrett, Charles L.,	Chester Co.,	Pa.	D. S. Jones, Ph. G.
Bateman, Wm. Henry Stevens,	Mahanoy City,	Pa.	T. J. Lightcapp, Ph. G.
Baur, Jr., William Christopher,	St. Clair,	Pa.	S. E. Walker.
Bender, John Jacob,	Shippensburg,	Pa.	S. S. Loughead.
Benerman, Alan Herbert,	Philadelphia,	Pa.	H. C. Blair's Sons.
Bennum, Charles Henry,	Georgetown,	Del.	H. Swaim, Ph. G.
Bentley, David Fuller,	Philadelphia,	Pa.	R. Shoemaker & Co.
Berkemeyer, Francis Molton,	Kutztown,	Pa.	H. Duffield, M.D.
Berkstresser, Watson J.,	Huntingdon,	Pa.	J. H. Black & Co.
Bickel, Harry Lee,	Felton,	Del.	F. E. Morgan.
Bilheimer, John Jessiah,	Bath,	Pa.	Dr. G. P. Kern & Co.
Birch, Harry Rees,	Philadelphia,	Pa.	Bullock & Crenshaw.
Boger, Charles Everett,	Lebanon,	Pa.	George W. School.
Bowers, Charles Edward,	Middletown,	Pa.	A. Robbins, Ph. G.
Bowman, David Buchanan,	Lancaster,	Pa.	W. G. Baker, Ph. G.
Boyer, Allen Webster,	Allentown,	Pa.	W. E Moyer, Ph. G.
Bradley, Augustus,	Tarboro,	N. C.	W. H. McNair, Ph. G.
Brick Harry Walter,	Fitchburg,	Mass.	Bullock & Crenshaw.
Bright, William Willits,	Muncy,	Pa.	J. R. Smyser, Ph. G.
Brown, Barton Levi,	Pleasant Grove,	Pa.	J. Harry Love, Ph. G.
Brown, Walter Lee,	Camden,	N. J.	A. P. Brown, Ph. G.
Buchanan, Frank,	Crum Lynne,	Pa.	C. H. Roberts,
Burget, Harry Edward,	Terre Haute,	Ind.	W. C. Buntin.
Burnett, James Howard,	Hackensack,	N. J.	L. B. Hirst.
Butt, Simon Mark,	Gettysburg,	Ohio,	L. E Sayre, Ph. G.
Butters, Charles Hayes,	Titusville,	Pa.	T. W. Reuting, Ph. G.
Butterworth, Frank James,	Lenni,	Pa.	C. L. Lashelle, M. D.
Cahill, Frank Joseph,	Trenton,	N. J.	J. E. Cahill.
Caldwell, Florence Moore,	Jenkintown,	Pa.	S. W. Caldwell, M. D.
Campbell, Clarence Henry,	Easton,	Md.	M. Campbell, Ph.G.
Carman, Frank Hamilton,	Pennsgrove,	N. J.	Dr. M. Johnson.
Carritte, Clarence Edgar,	St. Paul,	Minn.	J. P. Carritte.
Cartwright, Benj. Franklin,	Philada.,	Pa.	Dr. Wm. Delker.
Cassaday, Frank Valorus,	Alliance,	Ohio,	A. S. Cassaday.
Cassidy, John Francis,	Philada.,	Pa.	W. H. Pile & Son.
Castle, Abraham Lincoln,	Upland,	Pa.	J. J. Parker.
Christ, Franz,	Philada.,	Pa.	W. J. Wilkinson, Ph. G.
Clabaugh, Edgar M.,	Altoona,	Pa.	D. G. Hurley, Ph. G.
Clapham, Benson Grant,	Mifflinburg,	Pa.	H. C. Clapham, Ph. G.
Clarke, E. Edwin,	Bradford,	Pa.	Thompson & Wood.
Clavin, James,	San Antonio,	Texas,	W. R. Clavin.
Cline, John Halliday,	Middleport,	Ohio,	E. Davis & Co.
Cochran, Levi Bennett,	Oneida Castle,	N. Y.	J. H. Cool.
Codville, Wm. Lowther,	Philada.,	Pa.	C. G. A. Loder, Ph. G.
Codville, Henry Lawson,	Philada.,	Pa.,	W. O. Higgate, M. D.
Collings, Walter,	Gloucester,	N. J.	D. W. Flemming.
Cope, Frank Henry,	Philada.,	Pa.	J. M. Higgins.
Cooper, Percival Valentine,	Media,	Pa.	M. W. Dickeson.
Cottam, Charles Marquis,	Beaver Falls,	Pa.	J. Fajans, M. D.
Cotton, Frank Wilbert,	Bordentown,	N. J.	G. M. Carslake.
Courson, Harry Stockton,	Williamsport,	Pa.	Duble & Cornell.

Name.	*Place.*	*State.*	*Preceptor.*
Craig, George Tindall,	Wilmington,	Del.	Z. Jas. Belt.
Crane, William Howard,	Philada.,	Pa.	A. R. Finck, M. D.
Crawford, Archie Darrah,	Norristown,	Pa.	Wm. Stahler.
Crawford, Jr., Walter Beatty,	Chambersburg,	Pa.	Thos. L Buckman, Ph. G.
Daniels, Wm. Joseph,	Pueblo,	Col.	A. C. Daniels, Ph. G.
Darling, Dwight Kellum,	Salt Lake City,	Utah.	D. Turngren.
Davis, Edward,	Coal Dale,	Pa.	D. R. Davis.
Davis, Pierre Beaumont,	Gainesville,	Texas.	H. O. Cravens, Ph. G.
Davison, J. C.,	Washington,	D. C.,	A. D. Cuskaden, Ph.G.
Day, Frederick Samuel,	Philada.,	Pa.	Warrington & Pennypacker.
Deitz, George Arthur,	Chambersburg,	Pa.	W. L. Cliffe, Ph. G.
DeLaCour, Joseph Carl,	Camden,	N. J.	J. C. DeLaCour.
Dietz, Jr., Charles James,	Philada.,	Pa.	Dr. Wm Delker.
Dorman, William Albert,	Hartleton,	Pa.	M. L. Muench, M. D.
DuBois, Samuel Conier,	Philada ,	Pa.	J. R. Elfreth, Ph. G.
Eagle, Edward Worrell,	New Castle,	Del.	J. J. Black, M. D.
Edenborn, Chas. Wesley Simons,	Philada.,	Pa.	Dr. Bauer.
Eft, Frederick,	Palatine,	N. J.	Dr. C. G. Frowert.
Eldredge, Clarence Selby,	Cape May,	N. J.	Drs. Marcy & Mecray.
Engelman, Henry Shaffer,	Cherryville,	Pa.	Weaver & Hohl.
Enders, William James,	Harrisburg,	Pa.	F. Rapp, Ph. G.
Ensminger, Saml. Chas. Deeg,	Manheim,	Pa.	A. F. Gerhard, Ph. G.
Faries, Joseph Benjamin,	Smyrna,	Del.	S. P. Wright, Ph. G.
Fehr, George W.,	Landingville,	Pa.	Albert Cable.
Field, Claud,	Indianapolis,	Ind.	F. H. Carter.
Fiet, Harvey Jacob,	Philada.,	Pa.	P. G. A. Weber.
Finkeni, William Caspar,	Camden,	N. J.	D. G. W. Henry.
Foulkes, Stephen Harvey,	Terre Haute,	Ind.	J. F. Gulick.
Gabell, Cromwell Pearce,	Florence,	N. J.	
Ganster, William Foster,	Reading,	Pa.	F. X. Wolf.
Geist, Richard Clement,	Medford,	N. J.	H P. Thorn.
Gillispie, Henry Robert,	Reserve,	Kas.	J. M. Cecil, M. D.
Glenk, Robert,	Philada.,	Pa.	Julius Israel.
Goll, Philip,	Wildensee,	Germany,	Wm. J. Shaeffer.
Gould, Henry Zinn,	Carlisle,	Pa.	White & Bro.
Gracey, Archibald Gracey,	Philada.,	Pa.	W. B. Banks, Ph. G.
Greenfield, Lewis Thompson,	Carlisle,	Pa.	H. C. Blair's Sons.
Greenfield, Oliver Roat,	Philada.,	Pa.	Dr. Krause.
Griffin, Howard Ezra,	Scranton,	Pa.	Chas. Henwood.
Groom, Joseph,	Philada.	Pa.	Hance Bros. & White.
Guthrie, DeWitt Clinton,	Wilkesbarre,	Pa.	W. D. White.
Hackney, George Wyly,	Uniontown,	Pa.	H. S. Clark.
Hall Marlborough,	Philada.	Pa.	H. C. Blair's Sons.
Hallowell, Bruce Clyde,	Frankford,	Pa.	G. S. R. Wright.
Hance, Jr., Edward Hance,	Philada.,	Pa.	Hance Bros. & White.
Handler, William,	Cleveland,	Ohio.	H. Mueller, M. D.
Harpel, Luther Grant,	Lebanon,	Pa.	J. T. Shinn Ph. G.
Hatcher, Robert Anthony,	New Orleans,	La.	J. L. Lyons & Co.
Haupt, William Grant,	Hartleton,	Pa.	M. L. Muench.
Hausmann, Fred. William,	Philada.,	Pa.	Chris Weiss.
Heiges, William Smith,	York,	Pa.	Wm. Smith & Co.
Hertel, Fred. Gustave,	Nashville,	Ills.	Wm Grubs
Hinkson, Wm. Elwood,	Chester,	Pa.	Chas. E. Davis.
Hoffecker, Robt. Crockett,	Dover,	Del.	T. C. Tomlinson, M.D.
Hoffman, Erdman,	Leipsic,	Del.	J. M. Wert, M. D.
Hostetter, Andrew Grider,	Florin,	Pa.	Corwin Mullock.
Houghton, John Almer,	Salt Lake City,	Utah.	J. F Allen.
Howard, Mrs. C. E.,	Philada.,	Pa.	H. B. Snavely, Ph. G.
Howell, Samuel Emerson,	Camden,	Del.	C. E. Downes.
Hughes, Frank Stacker,	Norristown,	Pa.	J. G. Wells, Ph. G.

Name.	*Place.*	*State.*	*Preceptor.*
Hume, Ward Dutcher,	Minneapolis,	Minn.	R. McNeil.
Humma. Henry John,	Reading,	Pa.	H. M. Muhlenberg, Ph. G.
Jacob, Charles Pim,	West Grove,	Pa.	F. Jacoby, Jr.
Jacobs, Oliver Barron,	Bridgeville,	Del.	R. W. Cannon.
James, Henry Hughes,	Wyoming,	Pa.	E. Wilson.
Johnson, Frank R.,	Chester,	Pa.	G. Banks Wilson.
Jones, Will Lincoln,	Catasauqua,	Pa.	Wm. Heckenberger.
Judge, John Aloysius,	Philada.,	Pa.	Bullock & Crenshaw.
Jump, Henry Draper,	Dover,	Del.	Dr. S. D. Marshall.
Kappes, Jacob J.,	Zanesville,	Ohio.	Hatton Brothers.
Kantner, Harry Baker,	Altoona,	Pa.	D. W. Levy.
Keller, Augustus Herman,	Philadelphia,	Pa.	A. G. Keller, Ph. G.
Kelly, John P.,	Elmira,	N. Y.	A. H. Baker, M. D.
Kendig, Allen Jesse,	Philadelphia,	Pa.	R. P. Marshall.
Kennedy, Alfred Dennis,	Philadelphia,	Pa.	A. Nebeker, M. D.
Kennedy, Harry Milton,	Cape May,	N. J.	Dr. Kennedy.
Kern, Franklin,	Slatington,	Pa.	S. Everett Betts, Ph. G.
Kiger, Harry Stiles,	Wilmington,	Del.	H. C. Snitcher, M. D.
Kilgus, John Frank,	Renovo,	Pa.	M. L. Clay.
Kilgus, William Michael,	Renovo,	Pa.	E T Swain.
Kingston, Charlie Davis,	Granby,	Mo.	Powers & Benton.
Kleinstuber, William George,	Wilmington,	Del.	E. Hertel, M. D.
Klopp, Henry Leinbach,	West Leesport,	Pa.	S. H. Shingle, Ph.G.
Klopp, Peter Paul,	N. Heidelsburg,	Pa.	J. A. Gingrich.
Knowles, George Alexander,	Philadelphia,	Pa.	W. D. Kerr.
Kraemer, Henry,	Philadelphia,	Pa.	C. B. Lowe & Co.
Krauss, Gustav Adolf,	Bremen,	Germ'y	Wm. Proctor, Jr. Co.
Krider, Richard C.,	Philadelphia,	Pa.	Stryker & Ogden.
Lammer, Henry Bruno,	Philadelphia,	Pa.	Bullock & Crenshaw.
Latin, Adolph,	Dayton,	Ohio.	George Latin, Ph. G.
Lehman, Charles,	Highland,	Ill.	Edmund Knoebel.
Leine, Arthur Morris,	Honesdale,	Pa.	N. G. Ritter, Ph. G.
Leitch, Charles Thomas,	Quakertown,	Pa.	
Lesher, Edwin Charles,	Kutztown,	Pa.	M A. Hull, Ph. G.
Lesher, John Becker,	Shoemakerville,	Pa.	E. W. Sharp.
Lewis, Griffith Robert,	Catasauqua,	Pa.	E. D. Boyer, Ph.G.
Livingood, Albert John,	Reading,	Pa.	J. B. Raser, Ph.G.
Lowenberg, Joseph,	Bloomsburg,	Pa.	N. J. Hendershott.
Lowry, Sidney Allen,	Yorkville,	S. C.	May & May.
Macartney, Frank Hamilton,	Berwick,	Pa.	Grove & Kisner.
McCloskey, Chas. Edw'd Reese,	Knoxville,	Pa.	E. C. Warg, Ph. G.
McCouch, John Wanamaker,	Philadelphia,	Pa.	H. E. Ashmead.
McFadden, Robert,	Philadelphia,	Pa.	L. F. Segrest, Ph. G.
McIntosh, John R.,	Galion,	Ohio.	B. N. Bethel, M. D.
Mack, John Sandford,	Slatington,	Pa.	J. E. Williams.
McKee, Joseph Allen,	Altoona,	Pa.	Alton Clabaugh, Ph.G.
McKeel, Charles Baynor,	Washington,	N. C.	John McDonald, M.D.
McKnight, J. Irwin,	Pittsburg.	Pa.	H. G. Peters.
McLarty, Eugene,	Tradersville,	S. C.	C. D. Passapae.
McMechen. Wm. Benjamin,	Wheeling,	W. Va.	J. J. Ottinger, Ph. G.
McMillan, John C.,	Latrobe,	Pa.	W. A Fetters, Ph. G.
McNair, Edward Dudley,	Tarboro,	N. C.	L. C. Funk, Ph. G.
McNeil, Robert Carson,	Philadelphia,	Pa.	R. McNeil.
Macon, Gideon Hunt,	Warrenton,	N. C.	F. P. Hunter.
Macpherson, Frank Street,	Camden,	N. J.	L. H. Street.
Mayers, Henry John,	Wheeling,	W. Va.	
Meredith. Charles Clyde,	Palatine.	W. Va.	Dr. A. W. Taylor,
Merkel, William,	Minersville,	Pa.	Dr. J. M. Bradford,
Miles, Chas. John Austin,	Manchester,	N. J.	R. W. Cuthbert, Ph.G.
Miller, Charles Bodine,	Goldsboro,	N. C.	F. E. Morgan, Ph. G.

Name.	*Place.*	*State.*	*Preceptor.*
Miller, Solomon,	Hagerstown,	Md.	H. Knight, Ph. G.
Minner, Louis Augustus,	St. Louis,	Mo.	Thos. Knœbel.
Mittelbach, Henry,	Boonville,	Mo.	Wm. Mittelbach.
Moffet, John,	Philada.,	Pa.	J. Moffet.
Mohn, John Ellsworth,	Penn's Creek,	Pa.	J. W. Sampsell, M. D.
Möller, John Daniel,	Philada.,	Pa.	Dr. Lamparter.
Moody, Willie Bossieux,	Richmond,	Va.	W. L. Moody.
Moor, Jr., Edward,	Media,	Pa.	S. E. R. Hassinger, Ph. G.
Morgan, George Irving,	Lynn,	Mass.	F. E. Morgan, Ph. G.
Morris, Joseph Garrison,	Seaville,	N. J.	E. W. Sharp.
Moss, William,	Akron,	Ohio.	H. H. Ross.
Moyer, Reuben Emanuel,	Robesonia,	Pa.	H. D. Huntsman, Ph. G.
Murray, Emmett Leroy,	Americus,	Ga.	H. K. Mulford, Ph. G.
Murray, James Joseph,	Reading,	Pa.	J. A. Stein, Ph. G.
Murray, Robert William,	Harrisburg,	Pa.	A. W. Numemacher.
Musgrave, Aaron Wallace,	Bloomsburg,	Pa.	L. E. Sayer, Ph. G.
Myers, Carvosso Oursler,	Centralia,	Kas.	Dr. A. J. Best.
Myers, Frank,	Harrisonburg,	Va.	F. A. Lewis.
Nardyz, Emma Bour,	Philada.,	Pa.	S. Hayhurst, M. D.
Nichols, John Baugh,	Philada.,	Pa.	W. R. Warner & Co.
Ogden, Chas. Sheppard,	Camden,	N. J.	U. F. Richards.
Osmun, Milton Mackey,	Delaware,	N. J.	W. S. Freeman.
Owens, Harold Duche,	Philada.,	Pa.	D. Marshall & Bro.
Owing, Osmund Young,	Winnsboro,	S. C.	Chas. Shivers.
Palmer, Chas. W.,	Frenchtown,	N. J.	J. B. Cooke.
Perrenot, Emile Alfonso,	New York,	N. Y.	T. M. Galbraith, Ph. G.
Pfeiffer, Charles Alfred,	Baltimore,	Md.	J. H. Evans, Ph. G.
Pickett, Charles Torbert,	New Hope,	Pa.	H. C. Blair's Sons.
Pierce, Wm. Abner,	West Chester,	Pa.	T. G. Pierce.
Pollock, Jr., Robert Blair,	Philada.,	Pa.	R. Pollock.
Porter, Crawford Washington,	Philada,	Pa.	Jas. T. Shinn, Ph. G.
Porter, M. Arthur,	Canton,	Pa.	Mix & Whitman.
Potts, George Clinton,	Harrisburg,	Pa.	Dr. W. M. L. Weills.
Quackenbush, Fred. Briggs,	Penn Yan,	N. Y.	W. W. Quackenbush.
Ramsey, Charles Carroll,	Floyd,	Iowa,	Dr. Ellis.
Ranftle, Oscar,	Long Island,	N. Y.	W. E. Lee, Ph. G.
Ray, George Herbert,	Portland,	Oregon,	Plummer & Byerley.
Raynor, Howard Lincoln,	Norristown,	Pa.	R. Shoemaker & Co.
Read, Ralph Maynard,	Osceola Mills,	Pa.	F. B. Read, M. D.
Reading, Joel Salter,	Lambertville,	N. J.	G. P. Scheehle, Ph. G.
Redner, Thaddeus Rowland,	Philada.,	Pa.	Kennedy & Burke.
Reider, Edwin Stanton,	Williamsport,	Pa.	Duble & Cornell.
Reig, Eugene George,	Warren,	Pa.	L. G. Noyes.
Reith, Emil,	Philada.,	Pa.	T. A. Walker, Ph. G.
Reynolds, May,	Philada.,	Pa.	A. M. Reynolds, M.D.
Rhoads, Harry Paist,	Doylestown,	Pa.	Dr. T. E. Conard.
Richards, Davis Bruce,	Philada.,	Pa.	Wm. Weber.
Richter, Gustave Adolph,	Philada.,	Pa.	J. D. Groves, M.D. Ph. G.
Ridgway, Charles Alexander,	Hydetown,	Pa.	J. H. Kerr, Ph. G.
Risnell, John Dauberman,	Bellefonte,	Pa.	John Harris.
Risley, Leon Stewart,	Manchester,	Conn.	W. A. Lowry.
Rogers, William Black,	Jefferson,	Pa.	Blachly & Rogers.
Rolleston, Arthur Raymond,	Philada.,	Pa.	Harry Cox, Ph. G.
Rosenkrans, Cyrill Depue,	Fairdale,	Pa.	Geo. B. Evans, Ph. G.
Ross, William M.,	Richmond,	Ind.	W. H. Ross.
Roth, Saml. Geo. Jeremiah,	Laury's,	Pa.	A. B. Wenrich, Ph. G,
Rudy, Jacob Albert,	York,	Pa.	C. B. Lowe, Ph. G., M. D.
Rutherford, Frank Park,	Cochranville,	Pa.	Humes Hall, Ph. G.
Schetky, Laurence Oliphant,	Mt. Holly,	N. J.	Bullock & Crenshaw.
Schleif, Wm.,	Milwaukee,	Wis.	Aschenbach & Miller.

Name.	*Place.*	*State.*	*Preceptor.*
Schloer, Chas. Albert,	York,	Pa.	Dr. C. S. Burland.
Schminky, Allen Beecher,	Lykens,	Pa.	A. G. Stanley.
Schultze, Henry John,	Cincinnati,	Ohio.	Edmund Backhaus, Ph. G.
Schutzenbach, Augustus,	Harrisburg,	Pa.	F. P. Albright, Ph. G.
Schwab, Leslie Watts,	Decatur,	Ill.	A. J. Blaine.
Schwacke, Charles Albert,	Charleston,	S. C.	A. H. Schwacke.
Schwenk, Wm. Henry,	Peoria,	Ill.	R. D. McDougal.
Shaw, Harry Burfield,	Philada.,	Pa.	A. S. Lamb.
Sherman, Joseph Bennett,	Bristol,	Pa.	J. K. Young.
Small, John Hamilton,	York,	Pa.	H. C. Blair's Sons.
Smedley, Albert Webster,	Chester,	Pa.	L. B. Hirst, Ph. G.
Smith, Frederick William,	Loudonville,	Ohio.	Geo. Holland, M. D.
Smith, John Stewart,	Lexington,	Ky.	J. A. Flexner.
Snyder, Howard Grant,	Lancaster,	Pa.	W. T. Baker, Ph. G.
Southall, Charles Morton,	Clarksville,	Tenn.	Owen & Moore.
Southerland, Thomas Raibe,	Wilmington,	N. C.	J. H. Hardin.
Stephen, Willie Leisse,	Reading,	Pa.	J. B. Raser, Ph. G.
Steltzer, Nathan Samuel,	Philadelphia,	Pa.	John A. Martin, Ph. G.
Stewart, Aaron Walter,	Philadelphia,	Pa.	J. R. Elfreth, Ph. G.
Stevens, Fred Madison,	Auburn,	Me.	T. J. Stevens.
Stoever, Harry Van Hoff,	Chester,	Pa.	J. M. Stoever, Ph. G.
Strunk, Lewis Curtin,	Quakertown,	Pa.	W. M. Bowen.
Thompson, Ebenezer Francis,	Titusville,	Pa.	E. K. Thompson.
Thompson, Herbert Moodie,	Thompsontown,	Pa.	Bullock & Crenshaw.
Thornton, Edward Quin,	Greensboro,	Ala.	A. Stollenweber & Son.
Trauck, Charles Cowdrick,	Tinicum,	Pa.	William Hummell,
Tyler Thomas Van Dyke,	Altoona,	Pa.	H. S Bartlett.
Upham, Samuel W.	Bath,	N. Y.	A. Kasson, M. D.
Vandegrift, Wm. H'y. Flitcraft,	Philadelphia,	Pa.	Wm. Reisert, Ph. G.
Van Dyke, Wm. Clinton,	Van Dyke,	Pa.	R. P. Marshall.
Wagaman, Samuel Edward,	Chambersburg,	Pa.	J. S. Nixson & Son.
Wallis, J. Frank,	Philadelphia,	Pa.	Dr J. M. Wallis.
Ward, Percy Hall,	Crisfield,	Md.	Hall & Atkinson.
Warren, Nathan Chew,	Upland,	Pa.	C. L Lashelle, M. D.
Watkins, Edmund Howell,	Girardville,	Pa.	G. W. Storie,
Weaber, Charles Henry,	Fredericksburg,	Pa.	Dr. T. M Reeder.
Weber, Wm.,	Philadelphia,	Pa.	R. J. Weber.
Weil, Joseph L.,	Reading,	Pa.	J. C. Sanderson,
Weiser, Walter Rupert,	York,	Pa.	D. F. Shull & Co.
Wells, Fred Barton,	Vineland,	N. J.	Dr. S. W. Gadd.
Westphal, Herman,	Hamburg,	Germ'y.	F. J. Koch.
White, E. Riall.	Salisbury,	Md.	Bullock & Crenshaw.
Williams, Solomon Cohen,	Charleston,	S. C.	Genois & Laubach.
Williamson, James Strickler,	Harrisburg,	Pa.	Dr. Theo. Jacobs.
Wischman, Joseph Washington,	Philadelphia,	Pa.	Louis Trupp.
Wishart, Frederick Gray,	Philadelphia,	Pa.	F. E. Harrison. Ph. G.
Witherow, John Howard,	Shippensburg,	Pa.	J. C Altick & Co.
Witmer, Albert Elam Ferre,	Philadelphia,	Pa.	D. L. Witmer & Bro.
Woertz, George Augustus,	Philadelphia,	Pa.	C. E. Hewitt, Ph. G.
Wolf Frederick Joseph,	Philadelphia,	Pa.	R. Shoemaker & Co.
Wood, Harry Sudduth,	Maysville,	Ky.	G. T. Wood.
Woodruff, John Stewart,	Bridgeton,	N. J.	J. L. Curry.
Worrall, Harry,	Wilmington,	Del.	N. B. Danforth, Ph. G.
Wright, John Armstrong,	Philadelphia,	Pa.	A W. Wright & Co.
Wright, Walter,	Camden,	N. J.	Dr. C. G. Hoell.
Young, Charles,	Johnstown,	Pa.	T. H. Potts, Ph. G
Yohn, Francis Jerold,	Pottstown,	Pa.	T. J. Hoskinson, Ph. G.
Ziegler, Roger William,	York,	Pa.	S. M. Gable.
Zinnel, Wm. Corson,	Philadelphia,	Pa.	H. L. Barber, Ph. G.

THE AMERICAN
JOURNAL OF PHARMACY.

FEBRUARY, 1889.

GOLD CHLORIDE AND SILVER NITRATE AS TESTS FOR FIXED OILS.

By Frank X. Mœrk, Ph. G.

A Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

Read at the Pharmaceutical Meeting, January 15th.

In the *Pharm. Ztschr. f. Russl.*, 1888, 721 (Am. Journ. Pharm., 1889, 23), E. Hirschsohn gives as a reliable and easily applied test for the detection of cotton-seed oil the behavior of this oil towards a chloroformic solution of gold chloride (1 gm. to 200 cc.), and asserts that it will indicate *one per cent.* in admixture with olive oil. The procedure is to take 5 cc. of the oil with 10 drops of the gold chloride solution and heat for twenty minutes by placing the test tube in a vessel containing boiling water, a red color indicating the presence of cotton-seed oil. With a view of confirming this apparently valuable test numerous samples of commercial oils were obtained, on which, however, little reliance for purity could be placed; from Mr. Geo. M. Behringer were received samples which he believed to be pure, based upon confidence placed in the producer as well as upon tests made with the samples; other samples were gotten in the chemical laboratory by means of solvents.

Before giving the results in detail it may be well to state that the test which Hirschsohn claims as so characteristic for cotton-seed oil was also obtained with the oils of arachis, ben, poppy (an imported oil), sesame and walnut kernel. To ascertain if these oils were contaminated with cotton-seed oil, or probably contained a common principle, their effect upon silver nitrate solution was tried, using the method of O. Hehner (*Analyst*, September, 1888, and Am. Journ.

PHARMACY, 1888, 575), 1 gm. silver nitrate, 200 cc. alcohol, 40 cc. ether, 0·1 gm. nitric acid; the oil with half its volume of this solution was kept in a water-bath at 100° for fifteen minutes, noticing the effect produced in this time. It was found that some fixed oils which could not be identified at the end of this time could be distinguished by heating for one hour in the same way, noticing the effect, and then cooling by placing in a vessel of cold water. The prolonged heating had, in addition to the color imparted, the effect of rendering most of the oils more viscid, while some of them became almost, others quite solid. The oils giving the red color with gold chloride behaved differently with silver nitrate, indicating that they were not identical.

For comparison the oils examined are divided into three groups: 1, *pure oils;* 2, commercial oils corresponding to those of group 1; 3, commercial oils of which no *reliable* specimens were examined, and hence cannot be commented upon.

In giving the results of the reagents with Au Cl_3, the time of observation was twenty minutes, if a color appeared sooner, the time is given; with silver nitrate, *a* indicates the effect in fifteen minutes, *b* in one hour.

1. Pure Oils.	Au Cl_3.	Ag NO_3.
Almond	No change..	*a*, light brown; *b*, red color.
Arachis	Red in 3 minutes.	*a*, dark red color; *b*, dark gray green, almost solid.
Ben	“ “ 5 “	*a*, no change; *b*, brownish.
Burdock fruit	Precipitate of met. gold.	*a*, green brown, precipitate.; *b*, very dark brown.
Corn	“ “ “ “	*a*, dark red color; *b*, precipitate.
Cotton-seed 1	Red in 5 minutes.	*a*, gray green, ppt.; *b* } no change.
“ “ 2	“ “ 3 “	*a*, “ “ “ *b*
“ “ 3	“ “ 5 “	*a*, “ “ “ *b*
“ “ 4	“ “ 4 “	*a*, dark “ “ *b*
“ “ 5	“ “ 3 “	*a*, gray “ “ *b*
Hemp-seed (dark)	Indistinct dark color.	*a*, dark green color; *b*, no change.
Lard	No change.	*a*, no change; *b*, gray black, ppt.
Mustard	“ “	*a*, green black, ppt.; *b*, no change.
Olive, Mottet, (4 years old)	“ “	} *a*, greenish, slight ppt.; *b*, no change.
“ “ (6 mos. old)	“ “	
“ Lucca	“ “	
“ Kimball	Slight precipitate of Au.	*a*, greenish; *b*, solid.
Peach-kernel	No change.	*a*, light brown; *b*, gray black, ppt.
Poppy-seed (imported)	Red in 3 minutes.	*a*, light brown; *b*, solid.
“ “ 2. (fresh)	Precipitate of met. gold.	*a*, dark brown; *b*, ppt. } remain liquid.
“ “ 3. (old)	“ “ “ “	*a*, black, ppt.; *b*, dark brown, ppt.
Rape	No change.	*a*, dark green; *b*, ppt.
Sesame	“ “	*a*, green black, ppt.; *b*, no change.
Sophora	“ “	*a*, light brown, ppt.; *b*, dark green, ppt.
Sun-flower	“ “	*a*, greenish; *b*, dark red brown.
Walnut-kernel, American.	Red in 2 minutes.	*a*, brown color; *b*, green black, ppt.

It will be seen that most of the oils give dark colorations or precipitates with silver nitrate, so that this test can not be used to indicate positively the presence of cotton-seed oil; there is, however, with cotton-seed oil always a grayish film separated on the sides of the test tube, with mustard and rape oils a film is formed which is of a black color, the color being due possibly in the first case to metallic silver, in the second case to sulphide of silver.

Arachis oil with silver nitrate develops in a few minutes a red color which then passes into a dark brown in the course of fifteen minutes; this test is apparently characteristic for arachis oil among the vegetable oils but is also given by some of the fish oils.

Cotton-seed oils may differ in the rapidity with which they react with both $Au Cl_3$ and $Ag NO_3$, this no doubt being due to the manner and completeness of the purification of the oil by chemicals; there is also a difference in their behavior to sulphuric acid. To ascertain something of the nature of the body giving the reaction with $Au Cl_3$, a portion of cotton-seed oil was mixed with alcohol and some pieces of potassium hydrate; after shaking a few minutes a clear solution was obtained which was poured off from the undissolved potassium hydrate into a large volume of water; by this means the unsaponified oil was again separated, the soap remaining in solution; the separated oil was now saponified and from the two soap solutions were precipitated the fatty acids. The acid obtained from the easily saponified portion of the oil contained a liquid and a solid portion which could be separated by cooling the mixture; with $Au Cl_3$ a very fine red coloration was produced; the acid from the more difficultly saponified portion of the oil was solid and gave only a momentary red color, changing into a violet and depositing a dark precipitate. The cause of the red color is hence to be found in the liquid acid.

2. COMMERCIAL OILS.

	$Au Cl_3$.	$Ag NO_3$.
Almond 1	Red in 5 minutes.	Red color, *a*, dark; *b*, very thick.
" 2	No change.	*a*, pale brownish; *b*, gray black, ppe.
Arachis	Red in 3 minutes.	Red color, *a*, dark; *b*, brown black, solid.
Lard 1	No change.	*a*, no change; *b*, brownish black, precipitate.
" 2	" "	*a*, no change; *b*, gray black, ppe.
Mustard	" "	*a*, dark, ppe; *b*, dark green, ppe.
Olive 1 (green)	Red in 3 minutes.	*a*, pale brown; *b*, dark red brown.
" 2	No change.	*a*, greenish; *b*, solid.
" 3	Red in 3 minutes.	*a*, gray green. ppe.; *b*, no change.
Poppy-seed	" " 3 "	*a*, pale brown; *b*, pale yellow, solid.
Rape	No change.	*a*, dark green, ppe.; *b*, no change.
Salad	Red in 3 minutes.	Red color, *a*, green, ppe.; *b*, gray black, thick.

Attention should be called to the difference between the poppy-seed oils; No. 1 is an imported oil, Nos. 2 and 3 were made from black poppy-seed by expression. The difference is so great that the oils were possibly made from different kinds of seed, the imported probably from white poppy-seeds.

Regarding these oils, some show adulteration: Almond, 1 with arachis oil; almond, 2 with peach-kernel oil; olive 1, the adulterant possibly a mixture; olive 3, with cotton-seed oil; salad, a mixture of arachis and sesame oils.

3. COMMERCIAL OILS.

	$Au\,Cl_3$.	$Ag\,NO_3$.
Castor 1	Slight precipitate of gold.	*a*, reddish; *b*, fluorescent, dark red, thick.
" 2	No change.	*a*, reddish; *b*, fluorescent, dark red, thick.
Croton	" "	*a*, no change; *b*, dark green, solid.
Cod liver 1	Red in 4 minutes.	*a*, dark brown; *b*, no change.
" 2	Slight precipitate of gold.	*a*, pale red; *b*, gray brown.
Fish (good sample)	Dark red in 20 minutes.	*a*, dark red; *b*, no change.
Neatsfoot 1	Red in 12 minutes.	*a*, greenish; *b*, solid.
" 2	No change.	*a*, yellowish; *b*, brownish, solid.
Linseed 1 (cold pressed)	" "	*a*, brown color; *b*, gray black, precipitate, thick.
" 2	Red in 3 minutes.	*a*, red brown; *b*, dark brown, thick.
" 3	No change.	*a*, no change; *b*, yel. green, ppt. "
" 4	" "	*a*, " " *b*, greenish, ppt. "
Sperm 1	Red in 5 minutes.	*a*, brown; *b*, no change.
" 2	No change.	*a*, light brown; *b*, green black, ppt.

Finally a few mixtures of olive and cotton-seed oils were made containing one, five and ten per cent. of the latter oil and subjected to the gold chloride test; the ten per cent. mixture gave on warming for 12 minutes a red color, very distinctly; the five per cent. mixture did not react in twenty minutes but if heated for one-half hour slowly deposited a precipitate of metallic gold; the one per cent. mixture showed no color whatever with gold chloride but with silver nitrate gave a slight deposit on the sides of the test tube. The separation of metallic gold by a number of the oils is probably traceable to the amount of reducing acid present being insufficient to give the red color.

Aqua chloroformi has not only antiseptic and anæsthetic properties (AM. JOUR. PHAR., 1888, pp. 408, 475), but according to Ullrich (*Prag. Med. Wochenschr.*, 1888, No. 33), is also an effective hæmostatic, very useful in bleeding from the gums after the extraction of teeth.

ON SOME DRUG CONSTITUENTS.

Abstracts from Theses.

Chamomile Flowers.—On exhausting the flower heads of Anthemis nobilis with petroleum benzin, Ella Amerman, Ph. G., obtained a green wax, which after six recrystallizations from alcohol was nearly white, bitter and crystalline, and melted at about 130° C. On exhausting the drug now with ether, and treating this extract again with ether, as recommended by Camboulises in 1871, a crystalline substance, distinctly acid, and of a glucosidal nature was obtained. A small quantity of similar crystals was also obtained by Werner's process (1867) by exhausting with dilute acetic acid, concentrating, precipitating with alcohol, treating with chloroform, evaporating, exhausting with ether and treating this extract with warm distilled water. In a third experiment the alcoholic tincture of the flowers was concentrated, precipitated by water, the filtrate treated with chloroform, the solvent evaporated and the residue treated with water. The aqueous solution of the crystals, on being boiled with hydrochloric acid, became opalescent, emitted a honey-like odor, and with Fehling's solution now gave evidence of the presence of glucose. There was no evidence of the presence of an alkaloid.

Diospyros virginiana, Lin.—The bark of this tree is of a tan color, and has a mucilaginous bitterish, then sweetish and astringent taste. Experiments made by Frank E. Murphy, Ph. G., gave the following results: The powdered bark yielded to petroleum benzin 0·9 per cent. of an amber colored extract, free from volatile oil. Ether took up 1·4 per cent., the extract yielding to alcohol a wine colored mass, which deposited from chloroform in stellate or granular crystals. The alcohol extract of the bark amounted to 2·5 per cent. and was partly soluble in water. The water extract weighed 12 per cent. and contained mucilage and dextrin. The extracts thus far obtained yielded a purple color with alkalies, the reaction being due to yellow coloring matter. On treating the exhausted bark with weak solution of soda, the mixture also acquired a deep purple color, and ultimately became gelatinous. The acid infusion of the residuary bark gave with ammonia a purple colored precipitate; calcium oxalate was not found.

A quantity of the partially ripe fruit was dried and treated with ether; on evaporating the solvent a granular extract was left, which became purple by alkalies from the presence of yellow coloring matter.

Eriodictyon californicum, Bentham.—An analysis of the leaves yielded to Oliver F. Lenhardt, Ph. G., 7·6 per cent. of moisture, and 4·25 per cent. (or for the anhydrous drug 5·14 per cent.) of ash. Of the latter 26·66 per cent. was soluble in water, 63·4 per cent. soluble in HCl, and 3·5 per cent. soluble in solution of KHO. Petroleum benzin extracted, including volatile oil, 2·63 per cent., of which ·39 was wax which separated from hot alcohol amorphous and melted at 61°C. With ether 15·3 per cent. of extract was obtained, of which three-fifths (9 per cent.) was a brittle, fragrant, and slightly acid resin soluble in 80 per cent. alcohol; a little tannin was also present, and the green tenacious residue was partly soluble in benzol, and entirely soluble in carbon disulphide, and in chloroform; alkaloids and glucosides were absent. The exhausted leaves yielded to absolute alcohol 3·64 per cent. of extract, fully one-third of which was soluble in water, among other constituents tannin and a glucosidal compound being dissolved. The watery extract of the exhausted leaves weighed 22·3 per cent., was of a brown color, had a pleasantly sweetish and somewhat acrid taste, and contained tannin.

Lycopus virginicus, Lin.—Sherman F. Hennessy, Ph. G., experimented with air dry bugle weed, containing 9 per cent. of moisture. Cold water dissolved 10·4 per cent. of constituents, consisting of albuminoids, gummy matter, a little tannin, and extractive. Alcohol now took up 12·8 per cent. of chlorophyll, resin, bitter extractive, etc. A small quantity of a lemon-yellow volatile oil was obtained by distilling the herb with water.

Stigmata Maydis.—John Rea, Ph. G., determined in the cold water infusion of corn silk (fresh?) the sugar by means of Fehling's solution, which indicated 0.88 per cent.; after boiling the infusion for one hour with hydrochloric acid, 1·42 per cent. of sugar was found.

Commercial Kino.—Chas. H. Breidenbach, Ph. G., examined five samples of Malabar kino and four samples of powdered kino, of which F and G were odorless and had a red-brown color, while H and I had a slight aromatic odor and a very dark-red grayish-brown color, and yielded a gray-brown ash, that of the other samples being white. The results are as follows:

SAMPLES.	PER CENT. OF		PER CENT. SOLUBLE IN			
	Moisture.	Ash.	Ether.	Absol. alcohol.	95 p. ct. alcohol.	Water.
A	11·27	1·37	·81	96·70	93·22	68·20
B	12·50	1·28	·43	97·65	93·50	69·32
C	10·79	1·42	·56	98·00	94·28	67·45
D	13·45	1·32	·67	92·56	90·72	70·90
E	12·92	1·20	·85	94·68	92·16	68·85
F	11·25	1·25	·74	96·24	92·50	68·76
G	12·62	1·34	·63	95·72	91·60	72·17
H	16·78	2·80	·25	99·00	97·42	55·72
I	17·92	2·50	·29	98·80	96·00	58·16

The ether soluble portion dissolved readily in alcohol, and this solution gave, with ferric chloride, a deep-green color. The portions insoluble in absolute alcohol yielded from 65 to 92 per cent. to water, except for H and I, which residues were completely insoluble in water. Of the same two samples the residues left by water treatment yielded to alcohol 98 per cent., while the corresponding residues of the remaining seven samples contained between 77 and 90 per cent. of alcohol soluble matter.

A quantity of gelatinized matter from old tincture of kino was procured and proved to be insoluble in acids, alkalies, alcohol, ether and water; but was not further examined since the kino which had yielded it could not be obtained.

Tincture of kino was made from some of the above samples the menstruum used being 1, the officinal one; 2, alcohol 85, glycerin 15; 3, dilute alcohol; 4, water 75, alcohol 25; 5, absolute alcohol, and 6, 95 per cent. alcohol. The best results were obtained with menstruums 4 and 5, the tinctures with 5 being practically free from precipitates; those with 4 containing a distinct precipitate, and the remainder showing, after a month or two, indications of gelatinizing. Tincture of kino yields with lead acetate a dark bluish precipitate; the same reagent gives with tincture of catechu a light yellow, and with tincture of kino containing 10 per cent. of catechu, a dingy gray green precipitate.

Pills of Thymol are conveniently made by using soap as an excipient, and are prepared by Dr. Frederic-Henry (*Jour. de Méd.*) in the treatment of various intestinal disorders. The thymol is given in doses of 0·12 to 0·15 gm. every six hours.

ON THE SOLUBLE GUM OF TRAGACANTH.

By John M. Maisch.

Read at the Pharmaceutical Meeting, January 15.

From an attentive student at a College of Pharmacy a letter was recently received as follows:

"While comparing your "Manual of Organic Materia Medica" with the United States Pharmacopœia I find a point where your book differs from the latter. You state that the fluid portion of the gelatinous mass, obtained by treating tragacanth with water, is precipitated by alcohol, while the Pharmacopœia says, this is not so. Is this statement of the Pharmacopœia correct?"

My attention having thus again been called to this statement of the Pharmacopœia, it was determined to repeat an experiment frequently made in former years. Some thin flakes of white tragacanth were washed with cold water, and then soaked in sufficient water without applying heat; cold water was then added from time to time with agitation, until the gelatinous mass remained sufficiently thin after standing for some time to permit the fluid portion to be separated by means of a wetted filter. On pouring some alcohol upon the clear filtrate, both layers remained clear also at the point of contact, and on mixing the two liquids, the transparency of the mixture was apparently not disturbed immediately; but on close examination the formation of a transparent jelly could easily be distinguished, and this separated after a while in the form of whitish flocks rising to the surface. The result corroborates that of experiments previously placed on record by others, and proves that a portion of tragacanth is soluble in cold water, and that this solution *is* precipitated by alcohol. In performing this experiment, it is necessary to avoid the use of heat, since tragacanth always contains starch which would be dissolved by hot water.

It seemed of interest to ascertain, if possible, how the error alluded to crept into the United States Pharmacopœia. Very probably it was copied from the British Pharmacopœia of 1867, as will be seen by comparing the texts of the two authorities:

B. P., 1867.	*U. S. P.*, 1880.
. . . . Swelling into a gelatinous mass which is tinged violet by tincture of iodine. After maceration in cold water the fluid portion is not precipitated by the addition of rectified spirit.	. . . Swelling with water to a gelatinous mass, which is tinged blue by test solution of iodine, and the fluid portion of which is not precipitated on the addition of alcohol.

The close similarity in the phraseology of these sentences leaves scarcely any doubt about the origin of the last one. The same error found also its way into the present British Pharmacopœia, published in 1885, the statement differing from the above quotation mainly in describing the color produced by iodine to be violet or blue.

It was to be expected that the statements of recent English and American writers on Materia Medica and on Chemistry would differ in regard to the question involved, and that some of them would have adopted, without reserve, the characterization of tragacanth as given by the two pharmacopœias, while others would give it as ascertained by experiment or from the writings of others. Such has indeed been found to be the case as will be seen from the following brief summary.

Regarding merely the effect of water upon tracaganth, the latter is described by Bloxam, Edes, Fownes and Wood, as being *not soluble*, but merely swelling in water. The property of swelling with water to a gelatinous mass is, as a matter of course, mentioned by all writers; but in addition to this tragacanth is described to be *sparingly* or *very sparingly soluble* in water by Allen, Brunton, and Milne, (edit. by Craig). These writers do not allude to the effect of alcohol upon the soluble portion.

In several works the correct statement is made that tragacanth is insoluble in alcohol; but this property does not throw any light upon the behavior of the aqueous solution, since some of the vegetable mucilages are insoluble in alcohol when treated directly with this liquid, while their aqueous solutions are not disturbed on the addition of alcohol.

A nearer approach to the behavior of the water-soluble portion of tragacanth is found in Attfield, Biddle, and in Bentley and Trimen's Medicinal Plants, where that portion is said to *resemble* arabin, but the points of resemblance or difference are not given. Potter and Prescott (proximate analysis) state the soluble gum to *be* arabin.

The language of the British Pharmacopœia is quoted in the works on Materia Medica by Bentley, Bruce, Gerrard and Thorowgood, the last two stating that the alcohol test (non-precipitation of the aqueous solution) shows the absence of gum arabic.

The correct behavior towards alcohol is given in Pharmacographia and in the manuals of Muter, Royle (edited by Harley) and Wills.

About half a century ago Pereira, in his Materia Medica, gave the following account, which was reproduced in the later editions:—"The soluble gum of tragacanth is usually regarded as similar to gum arabic, and hence it is called arabin; but is distinguished by silicate of potash and perchloride of iron producing no change in it, and by a peculiar appearance of the precipitate produced with alcohol (the precipitate is flocculent and collects in a simple opaque and mucous mass). In common with arabin it produces precipitates with diacetate of lead, protochloride of tin and protonitrate of mercury. Oxalate of Ammonia detects in it a calcareous salt."

Gmelin's Chemistry (Cavendish edition, XV., 209) states: "Tragacanth jelly curdles a solution of bichloride of tin; according to Bostock it forms a reddish precipitate with mercurous nitrate; according to Pfaff a white precipitate with both mercurous and mercuric nitrate. It is precipitated by alcohol.

The use of the word *not* in the sentences quoted above from the Pharmacopœias was probably at first an inadvertent error, as suggested by Oldberg and Wahl's "Companion;" but since such errors are likely to be perpetuated in print, it was deemed advisable to again call attention to it at the present time.

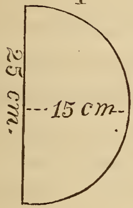
ON FILTERS.

By Edo Claassen.

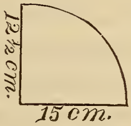
It is well known, that analytical work always requires filtering paper of very good quality; in many cases even the best kind obtainable is necessary. The expenses caused by the high price of such paper are not inconsiderable. On account of this fact and with the purpose, probably, to reduce the cost of filters, Rother recommended the use of pieces of paper, exactly half as large as those usually taken for filters. His filters have a somewhat unsymmetrical shape, unless they are trimmed at last by cutting off the useless and objectionable part. By this operation, however, some paper is wasted, which is entirely prevented, if the filters are made according to the following directions: Patterns (corresponding with the size of the filters wanted, for instance with such, having a radius [semi-diameter] of 12½, 17½, 22½, 27½, 32½, 37½, 42½, 50, 60, 80, and 100 centimeters) are constructed from circular discs of tinned sheet-iron of the same size by cutting off somewhat more than one half the disc (see fig. 1.) through a point distant from the edge 15, or respectively 21, 27, 33, 39, 45, 51, 60, 72, 96 or 120 centimeters. The small section of the disc, if of no use for smaller patterns, may be rejected. Such a pattern is placed on a sheet of paper, a piece of which is then cut off by allowing the scissors to go around on the edge of the tinned iron. This piece is now folded once in such a manner that one part entirely covers the other (fig. 2).

It is then folded so far on the straight open side, that both the straight sides now present are of equal length (fig. 3). The narrow folded part (2½ centimeters wide, if a filter of the smallest size above mentioned is to be made) is folded once more, after which operation the filter is ready for use. If the funnel on hand should happen to have a larger angle (be wider) than 60°, the filter may be easily adjusted by folding the narrow part in the direction from a to b (fig. 4); if, however, the angle of the funnel should be smaller than 60°, the filter may be made to fit by folding the closed side in an oblique direction as shown (fig. 5).

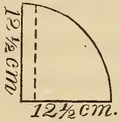
I



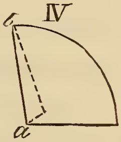
II



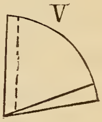
III



IV



V



By making filters in this way, two-fifths of the paper necessary for ordinary filters are saved; but three sheets are used instead of five, a matter of importance and therefore to be taken notice of.

It is obvious that this kind of filters will suit also for pharmaceutical work in all cases, which allow or require the use of a plain filter. It, furthermore, may be taken into consideration, that, no doubt, filtration will go on much quicker by means of such a filter than by an ordinary plain filter, it offering a simple layer only of paper to the liquid to be filtered.

MODIFIED FORMULA FOR BROWN MIXTURE.

By J. H. Buckingham, Ph. G.

Read at the Pharmaceutical Meeting, January 15th.

It has always seemed strange that, in this "Age of Elegant Pharmacy," no special attention has been paid to the improvement of such a valuable preparation as the Mistura Glycyrrhizæ Composita. The last Pharmacopœia made a step in that direction, by the substitution of the purified extract of glycyrrhiza, but still the sediment in part remains. After several experiments I beg leave to suggest to the committee on the revision of the Pharmacopœia, the following formula. The finished preparation, a sample of which I send, is elegant in appearance, palatable in taste, contains no sediment, and is made of the ingredients in the proportion according to the Pharmacopœia.

Purified Extract of Glycyrrhiza	½	oz. avoir.
Sugar (loaf)	½	“ “
Gum Arabic in selected pieces	½	“ “
Camphorated tincture of Opium	2	fl. oz.
Wine of Antimony	1	“ “
Spirit of Nitrous Ether	½	“ “
Ammonia water	1	fl. dr.
Water	12	fl. oz.

The mixture of glycyrrhiza, sugar and gum arabic is tied up in a bag. Having mixed the other ingredients, with the exception of the ammonia water, I place them in a wide-mouth bottle and suspend the bag in the liquids. In two days the liquid will dissolve the solids and then I add the ammonia and make the whole measure one pint by the addition of water. All the physicians, to whom I have shown the preparation, are very much pleased; and recommend it, as superior to any “Brown Mixture” they have seen.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Mœrk, Ph. G.

Thiol is a new remedy proposed by Dr. Jacobsen as a substitute for ichthyol; it is made by heating the distillate from peat-tar to 215° with 12 to 15 per cent. sulphur; by treating this product with strong sulphuric acid the sulpho-acid is produced which, after purification, is neutralized with ammonia forming ammonium sulpho-thiolicum, or simply called thiol. It is soluble in water and in a mixture of alcohol and ether, but not so soluble in either solvent singly. The sodium salt is analogous with the above and contains 12·1 per cent. sulphur. They have the same remedial value as ichthyol.—*Apoth. Ztg.*, 1888, 1056.

Ichthyol Pills are recommended by Deni to be coated with balsam of tolu to mask the odor.—(*Pharm. Weckbl.*), *Pharm. Ztg.*, 1889, 7.

Ink and Rust Stains are removed easily by a solution containing ten parts each of tartaric acid, alum and distilled water. The solution has the trade name “encrivoir.”—*Pharm. Ztg.*, 1889, 7.

Acetone in Methyl Alcohol.—By addition of an excess of standard iodine solution in presence of potassium hydrate the acetone is converted into iodoform; the excess of iodine is present as iodide and hypoiodite of potassium which react, on acidifying with hydrochloric acid, with each other to liberate iodine which is then titrated with standard sodium hyposulphite. Every 759·6 parts iodine used represent 58 parts acetone.—J. Messinger, *Ber. d. D. Chem. Ges.*, 1888, 3366.

Ash Determinations.—G. Kassner recommends the addition of an equal weight of finely divided metallic silver to such organic substances as are difficultly incinerated. The use is based upon silver absorbing oxygen at higher temperatures which is then readily yielded to the carbonaceous matter. F. Stolba has obtained complete incineration, in $\frac{1}{2}$ to $\frac{3}{4}$ hours, of substances which, without this addition, required six hours. Ferric oxide can be used in the same way, but the ash is not so easily examined. Platinic chloride and spongy platinum have been used with the same result as with metallic silver.—*Pharm. Ztg.*, 1888, 766, 781.

Manganese oxalate, if added to oils in quantity varying from 2 to 5 per cent., had decided advantages over other manganese or lead compounds in the manufacture of drying oils; the oils become markedly drying, and remain almost white. Manganese oxalate is decomposed by heat into manganous oxide, which remains in the oil, and carbon monoxide and dioxide liberated as gases.—J. Casthelaz (*Bull. Soc. Chem.*), *Chem. Rpt.*, 1888, 346.

Nitrobenzol, if present with oil of bitter almond, can be detected by the following method: Warm with a little sodium hydrate and add ferrous sulphate to destroy odor of hydrocyanic acid; an addition of considerable excess of potassium permanganate will now remove the odor of oil of bitter almond by oxidizing this compound to benzoic acid, while the treatment does not affect the nitrobenzol, which now can be easily detected by its odor.—Dr. K. List, *Chemiker Ztg.*, 1888, 1727.

Antifebrin in Phenacetin, if present to extent of five per cent. or more, can be readily identified by making a saturated aqueous solution, and adding to this half a volume of bromine water. Antifebrin decolorizes the bromine water immediately, and in a few moments a crystalline precipitate appears. Phenacetin neither decolorizes the bromine water nor gives the precipitate, which is supposed to be acet parabromanilide, and is almost insoluble in water.—E. Hirschsohn, *Pharm. Ztschr. f. Russl.*, 1888, 794.

Solubility of corrosive sublimate in solutions of sodium chloride. Dr. Homeyer and E. Ritsert report the following:

Percentage of Na Cl solution.	100 parts Na Cl solution dissolve at 15°	at 65°	at 100°
26 per cent. (saturated).	128 gm. $HgCl_2$	152 gm. $HgCl_2$	208 gm. $HgCl_2$
25 “	120 “ “	142 “ “	196 “ “
10 “	58 “ “	68 “ “	110 “ “
5 “	30 “ “	36 “ “	64 “ “
1 “	14 “ “	18 “ “	48 “ “
0.5 “	10 “ “	13 “ “	44 “ “

For hospital use, instead of a concentrated alcoholic solution, they recommend: Corrosive sublimate 50; sodium chloride 5; distilled water 45.—*Pharm. Ztg.*, 1888, 739.

Sodium hydrate containing nitrate is a common article of commerce, the origin of the nitrate being the demand for a pure white sodium hydrate, to obtain which from 2% to 3% nitrate are added by the manufacturer. This impurity is especially objectionable in nitrogen determinations using Kjeldahl's method by making the results too high.—Dr. Schweissinger, *Pharm. Centralhalle*, 1888, 587.

Syrupus Ferri Iodidi has been studied by Zelinka relative to its decomposition; the conclusions arrived at are that if a pure distilled water, free from chlorine, ammonia, carbon dioxide and other volatile impurities, obtained by rejecting the distillate until this gives no reaction with silver nitrate, be used in the preparation of the syrup a product will result that can be kept in larger quantites for a long time.—*Pharm. Post*, 1888, 794.

Volumetric estimation of glucose.—In the usual method by precipitation with Fehling's solution, the cuprous oxide renders the end reaction indistinct to prevent which H. Causse recommends the addition of ferro-cyanide of potassium to the reagent which will dissolve the precipitated cuprous oxide and which itself exerts no reducing action on Fehling's solution. To carry out the operation 10 cc. Fehling's solution are mixed with 4 cc. solution of ferrocyanide of potassium (1:2), heated to the boiling point and the sugar solution added, drop by drop, until the solution becomes colorless.—(*Bull. Soc. Chim.*) *Chem. Rpt.*, 1888, 338.

Volatile Alkaloid in Ipecacuanha.—E. M. Arndt in distilling a mixture of powdered ipecac, potassium carbonate, ferric chloride and water, noticed in the condenser white crystals while the distillate had an alkaline reaction and was fluorescent; the alkaloid was obtained in colorless cross-like crystals fluorescent at the edges and deliquescent. The hydrochlorate crystallizes best in octahedral form, and can be obtained in quantity from 0·3 to 0·5 per cent. The nitrate does not crystallize even when attempted over H_2SO_4, resembling nitrate of emetine. $PtCl_4HgI_22KI$, Nessler's reagent, and iodine solution yield precipitates; Na OH on boiling, evolves the odor of trimethylamine. The yield of emetine by the ferric chloride and potassium carbonate method of estimation is greater than by other methods, hence this precludes the decomposition of emetine.—*Apoth Ztg.*, 1888, 1036.

Oxygen can be prepared handily by the action of hydrogen dioxide upon potassium permanganate; 100 cc. of the commercial hydrogen dioxide, 3 per cent. will yield about one liter oxygen. A generating flask is half filled with the H_2O_2, made alkaline by a few drops of NH_4OH, and $K_2Mn_2O_8$, is slowly added through the funnel-tube (5cc. of a 0.3 per cent. solution), when the reaction ceases more of the $K_2Mn_2O_8$ is added. All of the available oxygen has been obtained if the liquid in the flask retains a red color on acidifying with sulphuric acid.—*C. F. Göhring, Chem. Ztg.*, 1888.

W. Lindner recommends the use of an acid solution of H_2O_2.—*Chem. Ztg.*, 1888, 1696.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the American Journal of Pharmacy.

Inalterable Iodide of Potassium Ointment.—A writer in the *Gior. Farm. Trent.* gives the following: Iodide of potassium, white Venice soap, distilled water, of each, 100; glycerin, 600; fresh, or benzoinated lard, 300. Dissolve the iodine in the water (using a water-bath), and then the soap; add the glycerin, and afterward the lard. As soon as the lard has melted stir rapidly and continually, and stand the dish in cold water.—*Repert. de Phar.*, Nov. 1888.

Incompatibility of Chlorate of Potassium and Iodide of Iron.—Sesquioxide of iron is formed, and the iodine set free: $2\,Fe\,I^2 + KClO^3 = Fe^2\,O^3 + KCl + 4\,I$. The administration of this mixture caused death.—*Boll. Farm.; L' Union Phar.*, Dec. 1888.

Glycerin Suppositories.—The following formulæ, presented by *Nouv. Rem.*, Dec. 24, are brought together from German sources; 1.

Cacao butter, 2·50 gm. to 5 gm.; glycerin, 1 gm. to 2 gm.; gum tragacanth, 2 cgm. to 4 cgm. 2. Glycerin, 90 parts; medicinal soap and mutton suet, of each 5 parts. Dissolve the soap in the glycerin and add the suet; melt and stir; pour into molds and let stand in a cold place for 24 hours. See also AM. JOUR. PHAR., 1888, p. 560.

LANOLIN IN SUPPOSITORIES.—According to M. L. Broutin, *Bull. Com.*, Nov., 1888, lanolin greatly facilitates the introduction into suppositories, of extracts or other substances soluble in water. He thinks that when the choice of an excipient is left to the pharmacist, he may properly replace a small quantity of the cacao butter with lanolin. The following formula is cited as having given excellent results: Dry extract of hamamelis, 1·75 gm.; lanolin, 9 gm.; cacao butter, 90 gm.; for 25 suppositories. The extract is heated with a sufficient quantity of water, to which the melted butter is added by degrees. The mass should be run off as soon as it commences to thicken. The suppositories are entirely homogenous.

INJECTION BROU.—The *Jour. de Phar. et de Chim.*, Jan. 1, gives the formula as follows: Make an infusion with: Crude opium, 50 cgm.; catechu, 50 cgm.; saffron, 1 gm.; boiling water, 200 gm. Filter, and add: Acetate of lead, 1·50 gm.; sulphate of zinc, 3 gm.

RATAFIA OF CACAO.—Dr. L. Jeannel having made this preparation in accordance with Guibourt's formula, as given in l'Officine, obtained unsatisfactory results. After trying several combinations he has arrived at the following, which he recommends: Cacao (bruised and torrefied), 750 gm.; sliced vanilla 2 gm.; alcohol of 56 per cent. 4000. Macerate for 15 days; strain; add to the residuum, boiling distilled water, 1,100. Leave to cool; add to the infusion, crushed sugar, 1300. Dissolve, mix with the alcoholic liquor, and filter.—*Bull. Com.*, Dec. 1888.

ARRACK OR YARAQUE.—In a communication to the *Académie des Sciences*, M. V. Marcano states that the natives of upper Orinoco make arrack from the root of Manihot utilissima or cassava. It is dampened, covered with banana leaves and allowed to stand for several days. The substance is then bruised and placed in a cylinder woven with banana leaves and having an opening at the bottom. From this aperture a thick, syrupy liquid runs slowly and is collected. The day before arrack is wanted, a bitter aromatic infusion is introduced at the top of the cylinder. The resultant liquor ferments very energetically and gives an intoxicating drink. Among some of the tribes the mass contained in the cylinder is simply thrown into water, where fermentation proceeds and gives a cloudy alcoholic liquor.—*J. de Phar. et de Chim.*, Jan. 1, 1889.

THE NATURE OF MILK.—The results of a study of this subject were lately submitted by M. A. Béchamp to the Paris Society of Pharmacy. The author's conclusions are: Milk is not an emulsion. The milky globules are not simple fat globules, but true adipose vesicles in a freed condition. Cow's milk contains, beside casein, albuminoid substances which are not free, being dissolved in combination with alkalis. Human milk is not, properly speaking, a casein milk; it contains a ferment which is peculiar to it. (See *Comptes rendus*, XCVI, p. 1508). Milk coagulates spontaneously, *i. e.*, without the aid of vibriones.—*L' Union Phar.*, Dec. 1888.

CORONILLA SCORPIOIDES.—Schlagdenhauffen and Reeb have separated from the leaves the bitter principle, *coronillin*, to which they assign the formula $C^{11}H^{12}O^{5}$. It is a yellowish powder, soluble in water, acetone and amylic alcohol; slightly soluble in chloroform and ether. Heated with diluted hydrochloric acid an amorphous resin is separated, to which the authors give the name of coronillein. This also occurs as a yellow powder but is not bitter to the taste. It is insoluble in water, but dissolves in alcohol, acetone and chloroform. Coronillin, say the authors, is a heart poison; coronillein has no perceptible physiological action.—*Nouv. Rem.*, Dec. 24, 1888.

TOXIC EFFECTS OF COCAINE.—Dr. Moizard reports that a child *aet.* four years took by accident 25 cgm. of cocaine. There was no immediate effect; the child went quietly to sleep. One hour afterward he awoke in frightful agony. The face was pale, respiration difficult, nausea, pains in the upper portion of the chest, formications, cramps of the limbs, and great muscular agitation. The child could get no rest, and was a prey to terrifying hallucinations. An enema with 50 cgm. of chloral, followed two hours later by one of 30 cgm., was given. The child began to get quiet. During the night it slept, but was frequently awakened by convulsive movements. On the following day it was perfectly well.—*Jour. de Méd.*, Dec., 1888.

ACTION OF HYOSCINE.—According to Gley and Rondeau (*Gaz. Méd. de Paris*, 1888, 10), hyoscine causes dilatation of the pupil, nerve paralysis, arrestation of the heart, suppression of the salivary secretion, paralysis of the cord of the tympanum and of the excito-secretory nerve. Sleep caused by hyoscine is accompanied with great muscular agitation. The experiments were made on dogs and rabbits.—*L' Union Méd.*, Oct. 4, 1888.

A Characteristic Reaction of Bismuth.—A solution of iodide of bismuth in iodide of potassium is sometimes used, under the name of iodobismuthate of potash, for the research of the alkaloids. It gives insoluble, orange-yellow compounds with many natural inorganic bases, but gives no indication of the nature of the alkaloid found. I have thought, writes M. E. Léger, that this would be otherwise should we use such a reagent in finding bismuth. I used a reagent composed of cinchonine, 1 gm.; iodide of potassium, 2 gm.; distilled water, 100 gm. The cinchonine is dissolved in water with the aid of a few drops of nitric acid; the liquid is heated and the iodide added. This solution, added to one of nitrate of bismuth gives an orange yellow precipitate. It should be used in excess, avoiding solutions containing hydrochloric or sulphuric acid; it must not contain too much nitric acid. This reagent may be used for metals precipitable by H_2S, whose sulphides are insoluble in sulphhydrate of ammonium. It gives, with minimum solutions of mercury greenish-yellow precipitate, turning black with excess; maximum solutions give yellowish-white; cadmium, white or yellowish; silver, the iodide if the argentic salt is in excess, yellow if the reagent is in excess; copper (minimum) precipitate of cupric iodide; maximum, brown maroon, containing iodine, copper and cinchonine; lead, sulphur-yellow precipitate, soluble in an excess of nitrate of lead, and containing iodine, lead and cinchonine.—*J. de Phar. et de Chim.*, Dec. 15, 1888.

THE ANATOMICAL STRUCTURE OF GRINDELIA ROBUSTA.[1]

By Joseph Beauvais, Moscow.

Grindelia robusta belongs to the order of Compositæ, suborder Tubulifloræ, and is an herb with oblong, thickish, light green and toothed leaves. Both sides of the leaves have the epidermis covered with a thick cuticular layer and contain glands and stomata. The glands consist of a one-celled base bearing the gland-cell which is filled with resin. Beneath the epidermis of both the upper and lower surface is found a layer of parallel palisade cells containing chlorophyll; the central part of the mesophyll consists of spongy parenchyma, in which the vascular bundles are imbedded. These bundles are closed, collateral, and are surrounded by a sheath of thick-walled collenchyma, gradually passing into the hypoderma of the upper and lower surface of the leaf. Rather large resin ducts are put within this collenchyma layer.

---

[1] Translated from *Berichte der Deutschen Botanischen Gesellschaft*, 1888, p. 403. —J. M. M.

Ths involucre of the flower head consists of spirally arranged scales. A transverse section through the top portion of these scales is nearly circular, and is covered with an epidermis, bearing glands and stomata upon the outer surface, and covering several tiers of palisade cells, both on the outer and inner surface. A vascular bundle in the centre of the scale is surrounded by a layer of collenchyma containing resin ducts.

The transverse section through the middle of the involucral scale is elongated in shape and is divided into an upper and a lower part by a rather broad zone of sclerenchyma. In the upper part beneath the epidermis is a palisade layer extending to the edges; but the lower part has no palisade cells, but contains elongated, thick-walled cells, forming large intercellular spaces. Near the base of the involucral scale the edges are free from palisade cells, but contain collenchyma.

The florets are small, and collected into many-flowered heads; those of the outer row are unisexual and ligulate, while the disc florets are tubular. The latter are on both sides covered with a cuticized epidermis, and contain a slightly developed mesophyll with compressed cells, which, however, are wanting in some parts of the corolla. The ligulate florets have a well-developed mesophyll consisting of thin-walled cells, and containing yellow oil in the intercellular spaces. Papillæ are formed on both sides of the epidermis.

Anthers, gynæcium and the seed show no striking characteristics. The receptacle has rather long appendages (Zotten) which differ from those of most compositæ in not containing vascular bundles.

Acetic Acid as an Antiseptic.—In ⅗ per cent. solutions, acetic acid has given favorable results as an antiseptic in gynecological practice. It has several advantages, in that it is not poisonous, like carbolic acid; it is hæmostatic, and becomes absorbed readily. It does not injure instruments like bichloride of mercury (*Jour. de Méd de Paris*).—*Med. News*, Nov. 24, 1888.

ARROW-POISON OF THE SOMALIS.[1]

By Arnaud.

The Somalis on the east coast of Africa prepare an arrow-poison from the aqueous extract of the wood, and especially of the root of Ouabaïo, a tree which is closely related to although not identical with *Carissa Schimperi*, a native of Abyssinia.

A concentrated extract of the wood in warm water was prepared and precipitated with lead acetate, the filtrate treated with hydrogen sulphide, and the second filtrate boiled and afterwards concentrated in a vacuum. The concentrated solution was mixed with six times its volume of alcohol of 85°, boiled, allowed to cool in shallow vessels, and the crystals thus obtained purified by recrystallization first from alcohol of 85° and afterwards from water.

The *ouabaïn* thus obtained contains no nitrogen and has the composition $C_{30}H_{46}O_{12}$. It forms thin, white, nacreous lamellæ with no taste, no smell, and a neutral reaction. It is almost insoluble in cold water, but is readily soluble in boiling water, with a great tendency to form supersaturated solutions, and also dissolves readily in moderately concentrated alcohol, but is almost insoluble in absolute alcohol and insoluble in ether or chloroform. At 180°, it becomes pasty with slight decomposition, and at 200° it is completely melted. A warm aqueous solution has a rotatory power $[\alpha]_D = -34°$. A concentrated aqueous solution gives a precipitate with tannin. When boiled with dilute acids, it yields a reducing sugar, and hence it would seem that ouabaïn is a glucoside.

When ouabaïn crystallizes from an aqueous solution, it contains 7 mols. H_2O which is not completely expelled below 130°.

When boiled with barium hydroxide, ouabaïn yields a barium-derivative which when dried at 100° has the composition $Ba(C_{30}H_{47}O_{13})_2$.

Ouabaïn has no toxic effect when introduced into the stomach, but when introduced by subcutaneous or intravenous injection, it acts on the heart and produces death. 2 milligrams will kill a dog of 12 kilos. in a few minutes.

Magnesium silicate is recommended by Dr. Debove in chronic diarrhœa. Dose 1·5 to 4·0 gm. To phthisical patients it is given with milk for a prolonged period.—*D. Med. Woch.*

---

[1] *Compt. rend.*, cvi., 1011–1014, reprinted from *Jour. Chem. Soc.*, 1888, p. 848.

STROPHANTIN.[1]

By Arnaud.

The crushed seeds of *Strophantus Kombé* are treated with boiling alcohol of 70° for several hours, and the solution distilled to a small bulk on a water-bath; the distillation is finished in a vacuum, care being taken that the extract remains liquid. The residue is cooled, the supernatant oil and resin separated, the liquid filtered, and heated with a small quantity of basic lead acetate and some finely powdered litharge. The liquid is again filtered, the lead removed by means of hydrogen sulphide, and the filtrate concentrated at 50° to a thick syrup, from which the strophantin slowly crystallizes. The crystals may be purified by recrystallization from boiling water; the yield is 4·5 grams per kilo.

Strophantin is a white bitter substance, which crystallizes in micaceous plates, grouped round a nucleus. It readily retains water mechanically, and also forms a hydrate, which loses its water in a vacuum or in dry air. The hydrate melts below 100°, and the residual strophantin is uncrystallizable. If, however, strophantin is carefully dried in a vacuum, it may be heated at 110° without alteration. Anhydrous strophantin becomes pasty at 165°, and partially decomposes. It acts on polarized light: the rotatory power of a 2·3 per cent. aqueous solution $[\alpha]_D = +30°$. It is only slightly soluble in water, and somewhat soluble in alcohol, but is insoluble in ether, carbon bisulphide, and benzene. It is precipitated from its aqueous solutions by tannin.

Strophantin contains no nitrogen, and has a composition corresponding with the formula $C_{31}H_{48}O_{12}$. It seems to be the immediate higher homologue of ouabaïn which it closely resembles in properties. Perhaps these and all other cardiac poisons have a common nucleus.

The removal of Warts by Carbolic Acid.—Professor B. Frankel, in the *Wiener medizinische Presse*, Oct. 1888, recommends the following method for the removal of warts: The skin surrounding the wart should be covered with cotton, and thus protected. Then, by means of a glass rod, apply the liquid carbolic acid to the wart and allow it to dry. No pain is perceptible. In the course of two or three days a part of the wart will fall off. Renew the application until all has been removed.—*Med. News*, Dec. 1.

---

[1] *Compt. rend.*, cvii., 179–182; reprinted from *Jour. Chem. Soc.*, 1888, p. 1310.

DIOSMIN.[1]

BY P. SPICA.

In the author's former examination of the leaves of *Barosma crenata* and *B. betulina*,[2] it was found that after the essential oil had been removed, alcohol extracted from the leaves a crystalline substance, which he called *diosmin*. The amount present in the leaves varies very much, not only with the season when they are gathered, but also with the age of the plant; at no time, however, is it large. The best way of extracting it is first to treat the leaves with light petroleum to remove the essential oil and waxy and resinous matters, then with cold alcohol of 85 per cent., which removes the chlorophyll and acid extractive substances, and finally to treat it with boiling alcohol of 80 to 85 per cent., which is the best solvent for the diosmin. It is very troublesome to purify, but this may be effected by treating the residue left on evaporation of the alcoholic solution successively with a solution of ammonium carbonate, cold alcohol, and ether, and then recrystallizing repeatedly from alcohol of 80—85 per cent.

When pure, diosmin is a white, crystalline powder, consisting of very slender microscopic needles, odorless, tasteless, and insoluble in most solvents. Its best solvent is boiling alcohol of 80—85 per cent. It melts at 243—244°, with decomposition and evolution of gas. If cautiously melted on platinum foil, it emits a pleasant odor resembling that of orange peel when it begins to burn; subsequently the odor is like that of caramel. Diosmin does not reduce Fehling's solution. It dissolves in concentrated sulphuric acid, and in solutions of the alkalis with yellow coloration, but at the same time undergoes alteration.

When diosmin is boiled for some time in a reflux apparatus with dilute hydrochloric acid, or with sulphuric acid of 3—4 per cent., it is resolved into a crystalline compound, sparingly soluble in water, and a substance easily soluble in water; the latter has a feeble dextrorotatory power, and is capable of reducing Fehling's solution. The crystalline substance is moderately soluble in alcohol, and still better in a mixture of alcohol and benzene. It forms minute, orange-yellow needles, for which no definite melting point could be obtained, but it appears to be somewhere about 145°.

The results obtained by the analyses of diosmin dried in a vacuum over sulphuric acid are, C = 53·43, H = 6·17 (mean of three analyses), which closely agree with the numbers obtained by Paternò and Briosi for hesperidin, namely, 53·44 and 5·92; but E. Hoffman, taking the formula as $C_{22}H_{26}O_{16}$ (C = 54·77 and H = 5·39), considers that the sample analyzed by Paternò and Briosi was incompletely dried, and that a temperature of 150° is necessary to remove all the water.

---

[1] *Gazetta*, xviii., 1-9; reprinted from *Jour. Chem. Soc.*, 1888, p. 1310.

[2] AM. JOUR. PHAR., 1886, p. 478.

On heating diosmin in a current of air at 150—160°, it lost 4·2 per cent. of water, and on analysis then gave numbers corresponding with C = 57·77 and H = 6·00. The author is making a careful comparison of diosmin with hesperidin, in order to ascertain whether they are identical or not.

LAUREL-NUT OIL.

By David Hooper.

The Alexandrian laurel (*Calophyllum Inophyllum*, L.) is distributed throughout India and Malaya, and is especially abundant on the western coast and in the native state of Travancore. The Hindustani name of the tree is Sultan Champa, the Tamil and Malayalam name is Punnai. Its thick green and glossy leaves resemble those of a laurel, but the tree is far removed from this family of plants, as it is really a Guttifer, belonging to the natural order Clusiaceæ. The fruit is about the size of a bantam's egg when ripe, and of a greenish yellow color; when dry it is brown or black and has a hard wrinkled surface. The seed, consisting of two white closely united hemispherical cotyledons, loses in drying 30 per cent. of water, and the dried seed yields 68 per cent. of fixed oils. This oil is largely used for burning, and is occasionally used for making varnishes and soap. In medicine the oil is employed either alone or mixed with more powerful remedies as a liniment for rheumatism, and is applied to ringworm and various skin eruptions. The tariff valuation of laurel-nuts in Travancore is Rs. 7 per cwt. and the oil Rs. 8 as against cocoa-nut oil Rs. 14 per cwt. The value of the exports of laurel-nut oil from Travancore during the past five years has been as follows:—1882–83, Rs. 74,314; 1883–84, Rs. 68,767; 1884–85, Rs. 48,997; 1885–86, Rs. 78,845; 1886–87, Rs. 57,148. In 1886–87 63 cwt. was exported from Alleppey. Dr. Watt says that although this oil cannot compete with castor oil for industrial purposes in the Calcutta market, it fetches about four times the Calcutta price of castor oil in Burma.[1] In the Colonial and Indian Exhibition[2] held in London in 1886, this oil was shown from India, Ceylon, Straits Settlements, Queensland and Fiji. It is known out of India as domba, dilo or ndilo oil.

Laurel-nut oil is greenish-yellow, bitter and aromatic, but it has not been investigated chemically. Lépine found a sample to have the sp. gr. 0·942, and to solidify at +5°. During a recent visit to Travancore, I found a large trade being done in the nuts and oil of *Calophyllum Inophyllum* in the village of Neyoor, about sixteen miles from Cape Comorin, and here I purchased a sample of oil for examination. The oil was similar in appearance to some I expressed myself from some freshly dried almonds obtained from Neyoor. The following notes give the results of a chemical examination of the oil made with the assistance of Allen's "Commercial Organic Analysis."

The oil had a greenish-yellow color, thick consistence, fragant odor and bitter taste. It commenced to congeal at the temperature of 19° C., and became quite solid at 16°, when it had a specific gravity of 0·9315.

The free acidity of the oil was found by shaking a weighed portion with alcohol and titrating the solution with normal alkali, using phenolphthalein as an indicator. One hundred grams of the oil required 1·89 grams of caustic potash to neutralize the free acids.

The oil was saponified by boiling a weighed quantity for one hour with alcoholic potash, and the excess of alkali was determined by titration with normal hydrochloric acid. It was found that 100 grams required 19·6 grams of KHO to convert it into a soap; the saponification equivalent was therefore 2 5·6. The soap solution in alcohol, allowed to stand for a few hours partially crystallized into lustrous white scales.

The volatile fatty acids obtained by Reichert's distillation process were very small in quantity, 2·412 grams of oil required the equivalent of 0·1 cc. of normal alkali for saturating the volatile acids, which is equal to 0·23 per cent. of KHO.

Two drops of sulphuric acid added to 20 drops of the oil gave a red coloration with orange streaks; after stirring the whole became an orange-brown mixture. The oil shaken up with an equal volume of nitric acid, sp. gr. 1·4, formed a light reddish-brown emulsion; after standing for an hour the oil separated with a rich mahogany brown color, and the lower acid liquor was red. Treating the oil according to Poutet's elaïdin reaction, and working at a temperature of 20°, the mixture of oil and nitric oxide solution congealed in two and a half hours; after twenty four hours it remained as a firm butter-like solid of a dull lemon color, and yielding to the pressure of the finger.

---

[1] "Guide to the Economic and Commercial Court," Calcutta, 1886.

[2] *Pharm. Journal*, [3], xvii., pp. 6, 142, 226.

5·045 grams of the oil were on November 7th exposed to the air in a watch-glass under a bell-jar, and weighed daily for one month. The increase in weight was just appreciable after the exposure; the weight on December the 7th was 5·047. This quantity of oil heated in a water-oven at 93° for eight hours gained 0·006 gram only.

The insoluble fatty acids amounted to 90·85 per cent. They crystallized into radiating tufts of acicular crystals having a melting point of 37·6°, and a specific gravity of 0·9237 (solid) at 16°, and of 0·8688 at 90°. Their mean combining weight, obtained by titrating the washed and dried acids with normal alkali and using phenol-phthalein as an indicator, was found to be 283·1. A lead soap of the fatty acids was made by decomposing the potash soap with a hot solution of plumbic acetate. After washing and drying, 1 gram was weighed out and shaken up with ether; the oleate of lead, or soluble lead soap, weighed ·44 gram after the ether had been rapidly driven off. The lead soap insoluble in ether was decomposed, and the purified fatty acids had a melting point of 58°.

The oil agitated with 85 per cent. alcohol removed the green coloring matter and a sticky extract possessing the peculiar melilot-like odor and the bitter taste. This extract amounted to about 7 per cent.; it was almost entirely soluble in dilute alkalies with an orange color, precipitated unaltered on the addition of acid, and was perfectly soluble in ether and chloroform. The green mass was boiled with water and the filtered liquor evaporated, had the odor of coumarin, but no rhombic crystals of coumarin could be observed in the slight residue when examined under a microscope. The alcoholic residue was crystalline, and contained some free fatty acids of the oil.

The conclusion arrived at from the examination of the laurel-nut oil is that it cannot be regarded as a drying oil, nor altogether as non-drying, but must take up an intermediate position between the two. In endeavouring to classify this oil with those that have already been investigated, the task is not difficult. Most of the experiments exhibit in a very striking manner a strong relationship to those of the cotton-seed oil group. The saponification equivalent, the high melting point of the fatty acids and the free acids are very remarkable, and the sulphuric and nitric acid tests are particularly allied to those performed upon cotton-seed oil.—*Phar. Jour. and Trans.*, January 5th, p. 525.

PHENOL AND SOME ALLIED SUBSTANCES AS TESTS WITH CONCENTRATED SULPHURIC ACID FOR NITRITES, NITRATES, AND CHLORATES IN AQUEOUS SOLUTION.[1]

By D. Lindo.

The author employed the following solutions in his numerous experiments. Phenol:—10 cc. of Calvert's No. 1 fused, dissolved in some water mixed with 25 cc. of 97 per cent. alcohol, and made up to 100 cc. with water. Orcinol:—5 grams dissolved in water, and made up to 100 cc. Sulphuric acid, pure commercial, sp. gr. 1·837 at 26°. Nitric solution:—1·8723 grams of potassium nitrate made up to 100 cc. = solution 100 N_2O_5. Nitrous solution:—0·4053 gram of silver nitrite dissolved in 100 cc. of boiling water, mixed with 0·160 gram of sodium chloride in solution, allowed to cool, made up to 200 cc., agitated, and when settled and filtered = solution 2000 N_2O_3. Chloric solution:—1·624 grams of potassium chlorate dissolved and made up to 100 cc. = solution 100 Cl_2O_5. The solutions of hydrochloric acid used were *a*, containing 26·16 per cent., *b* 13·08 per cent., and *c*, 4·88 per cent. The sulphurous acid solution contained about 4 per cent. of the gas. The ferric chloride about 36·5 per cent. of the salt, the ferrous sulphate 10 per cent., and the copper sulphate 0·5 per cent. of the metal. In all experiments, 0·5 cc. of the solution to be tested was mixed with one drop of phenol or two drops of orcinol solution, except with chlorates, when 1 drop of orcinol was employed; 2 cc. of sulphuric acid is then run down the side of the tube so as to obtain bands of color at the contact of the liquids. When sulphurous acid is used it is always added first, the phenol or orcinol being always the last added before the sulphuric acid. The following are some of the results obtained.

---

[1] *Chem. News*, lviii., 1–3, 15–17, 28–29, 40; reprinted from *Jour. Chem. Soc.*, 1888, p. 1337.

Phenol and nitrites:—A 200,000 N_2O_3 solution yields a faint pink band at first, faint green below; pink band very distinct in half an hour, but after five hours the color has faded away. 50,000 N_2O_3 solution gives good red and green bands at once, fading after five hours. 2000 N_2O_3 solution very intense red and green bands in 24 hours, the latter changes to blue and the red to dingy purple. Solutions of intermediate strengths give intermediate reactions, and even 400,000 N_2O_3 gives a very faint band. Hydrochloric acid impedes or retards the reaction, so that 1 drop of solution *a* renders the color with 200,000 N_2O_3 indistinct, and 2 drops upset the reaction with 50,000 N_2O_3 solution, and make the 10,000 give a light red band with yellowish-green below. Two drops of sulphurous acid, on the other hand, prevent the color forming even with the 2000 N_2O_3 solution; but with the addition of copper sulphate (see below) a slight pink band is obtained after two or three hours, presumably due to a trace of N_2O_5.

Orcinol and nitrites:—One of nitrite in 1,000,000 of water gives a faint but uncertain indication after some time; 500,000 N_2O_3 gives a very faint pink after four hours, becoming more distinct in nine hours; 10,000 N_2O_3 solution gives a strong orange band at once, becoming almost opaque after some time. The color is permanent. Hydrochloric and sulphurous acids both interfere with the reaction, but copper sulphate with hydrochloric acid increases the delicacy; 1,000,000 N_2O_3 + 1 drop of copper sulphate + 2 drops of orcinol + hydrochloric acid, sharp orange-pink band in 10 minutes.

Phenol and nitrates:—No reaction with 1 N_2O_5 in 20,000 of water, 10,000 N_2O_5 faint, pink band becoming broader and less definite, ultimately fading. 1000 N_2O_5, intense red band, pale green below becoming very dense. Intermediate and stronger reactions are given in the original. Phenol alone appears to be but a poor test for nitrates, but in the presence of hydrochloric acid it becomes very delicate; by adding one drop of solution *c* 100,000 N_2O_5 gives a faint pink at once, which becomes distinct in 20 minutes, spreads and ultimately fades; 10,000 N_2O_5, a sharp, crimson band at once, spreading without losing intensity for some hours, and faint green below, soon fading. 1000 N_2O_5, very dense red, green below. Sulphurous acid does not interfere with this test, or with the corresponding one with orcinol. Neither ferric chloride nor copper sulphate disturbs this reaction, in fact, the latter rather improves it with highly dilute N_2O_5 solutions;

but ferrous sulphate is fatal, so that with 1 drop of the solution, and hydrochloric acid 10,000 N_2O_5 gives no reaction, and 5000 is very indistinct.

Orcinol and nitrates:—The remarks which apply to phenol are mostly true of orcinol, but with the addition of hydrochloric acid the latter is more sensitive, indicating by a faint pink color 1 N_2O_5 in 200,000 in three hours, and with extreme faintness 1 in 500,000. The color is permanent, and orcinol may be regarded as very superior to phenol for detecting traces of nitrate in the presence of large quantities of hydrochloric acid or chlorides. Ferric chloride is objectionable, but neither sulphurous acid nor ferrous sulphate interferes with the reaction, whilst copper sulphate makes it more delicate; 500,000 N_2O_5 with hydrochloric acid, 1 drop of copper solution and 2 drops of orcinol gives sharp bands in five minutes.

With chlorates, phenol gives a pale yellow band with blue below, the latter soon fading with 10,000 Cl_2O_5; with 4000, the blue soon changes to dingy green, with 2000 the blue is dingy and becomes dingy green; with 1000 and upwards no blue is developed. Orcinol is somewhat more delicate, 100,000 Cl_2O_5 giving a faint transient blue band, which becomes more distinct as the strength of the solution increases, so that with 10,000 Cl_2O_5 a beautiful blue band is produced, soon acquiring the colors of the rainbow, 4000 gives a similar effect, but not so good, owing to interference of a deep green coloration: 1000 gives an intense green, soon turning brown, and 100 only a pale yellow. These changes are not observed with other oxidizing agents, and therefore this may possibly become a characteristic test for chloric acid. Hydrochloric and sulphurous acids interfere slightly with this reaction.

These reactions have been applied to the detection of nitrites, nitrates, and chlorates in the presence of each other, and the author has tested this point by various mixtures made from his solutions. With nitrites and nitrates in various proportions there seems to be no difficulty in detecting them both; the nitrite is first identified, the mixture is then treated with a drop or two of sulphurous acid to destroy the nitrite; to ensure the complete destruction of the nitrite the solution of the mixture should be acid; it is then tested again with hydrochloric acid and orcinol, or if great delicacy is desired, with the addition of copper sulphate, when mere traces of nitrate give a coloration. With nitrites and chlorates, the red coloration with phenol and sulphuric acid due to nitrites is first obtained; and then, after treatment with sulphurous acid, the chlorate may be detected by the blue color with orcinol and sulphuric acid. The results show that chlorate can be detected when mixed with a considerable excess of nitrite after the latter has been destroyed with sulphurous acid, but nitrites cannot be detected by this method if the chlorate is greatly in excess. With mixtures of chlorates and nitrates, the former cannot be detected if the latter are in considerable excess; but, on the other hand, a small quantity of nitrate can be detected in the presence of a large quantity of chlorate, since by allowing the sulphurous acid to act for about 15 minutes the chlorate is completely destroyed, whilst the nitrate remains and gives its color reaction in the usual manner; when, however, the chlorate is not in great excess the nitrate may even be detected with hydrochloric acid, phenol, and sulphuric acid, without previously destroying the chlorate. When all three are present in the same solution, they can be tested by these reactions only when the proportions indicated above are not exceeded; for instance, a mixture of equal volumes of 10,000 N_2O_3, 10,000 N_2O_5, and 10,000 Cl_2O_5 would give the red band with phenol and sulphuric acid for nitrites; a blue band with 1 drop of sulphurous acid and 1 drop of orcinol for chlorates; and by treatment with 2 drops of sulphurous acid and 1 drop of hydrochloric acid, allowing to remain 15 minutes, copper sulphate and orcinol would give the orange bands due to nitrate.

The presence of iodides, bromides, and even chlorides in large quantities would prevent the detection of nitrites, nitrates, or chlorates by this method, if these are present, therefore, the solution must be precipitated with silver sulphate. Thymol and *a*-naphthol do not give distinct and characteristic reactions for these salts under the conditions given in the paper; but the following test is recommended by the author for nitrite in very dilute solutions: two or three drops of the alcoholic *a*-naphthol and one or two drops of 1 : 1 sulphuric acid added to 10 cc. of 1 in 1,000,000 nitrite solution, gives in a few minutes a pale, greenish-yellow color; with much stronger solutions, a precipitate separates, and the color of the liquid approaches orange.

For the sake of comparison, the following substances were tested with sulphuric acid and 1 drop of phenol or 1 drop of orcinol to 0·5 cc. of the solution:—Potassium ferricyanide in strong solution gave a brown band with sulphuric acid alone, in weak solutions it gave a brown band with phenol, and yellow turning brown with orcinol. $\frac{N}{50}$ Potassium permanganate gave with *phenol* a broad, turbid, light reddish-brown band; and with *hydrochloric acid,* in addition, a broad, pale yellow upper band with a narrow, ruddy lower band, changing to bright vermilion; with *orcinol,* it gave reddish upper and dull green lower band, and with *hydrochloric acid* in addition a dull orange upper and emerald-green lower band; in presence of two drops of sulphurous acid, no reaction. Potassium dichromate, 0·5 gram per litre of water, with or without hydrochloric acid, gave with *phenol* a brown band soon becoming lighter, with *orcinol,* a dull, prismatic band; in presence of sulphurous acid no reaction; distinction from chlorates. Hydrogen peroxide, 3 vols. strength diluted with 20 vols. of water, gave with *phenol* a reddish upper, and dull green lower band, and with *hydrochloric acid* a very faint, purple band, changing to pink; with *orcinol,* a sharp reddish band, changing to dull orange above, olive-green below, and with *hydrochloric acid* a purple upper, weak olive-green lower band; no reaction in presence of sulphurous acid.

The above reactions refer only to dilute solutions as indicated in the paper; very different results would be obtained with either stronger reagents or stronger solutions. The average temperature throughout these experiments was about 26°.

The following is a convenient reagent for detecting nitrites or nitrates:—Dissolve 2·5 grams of orcinol in a mixture consisting of 25 cc. of 2 per cent. copper sulphate solution, 1 cc. of pure sulphuric acid, and 25 cc. of pure 15 per cent. hydrochloric acid, and filter; 2 drops of this are added to 0·5 cc. of the solution to be tested, and 2 cc. of sulphuric acid run in. If the reaction, as already described above, occurs in presence of sulphurous acid, nitrates are present.

Griess' Sulphanilic Acid Test for Nitrous Acid.—The author takes 5 cc. of nitrite solution, adds 1 drop of a saturated solution of sulphanilic acid in 1 : 5 sulphuric acid, 1 drop of phenol or thymol, and after 10 minutes mixes well with 1 cc. of ammonia. Thymol gives an orange-yellow not so defined as phenol. The limit of this method, using 5 cc. of solution, is 1 part of N_2O_3 in 10,000,000 of water. The author suggests the use of the method in the reverse order as a test for phenols. Orcinol gives as good a reaction as phenol, but becomes colored of itself on exposure to the air in presence of alkali, and is therefore untrustworthy.

VAPOR-DENSITY OF CHLORINE AND FERRIC CHLORIDE.[1]

By C. Friedel and J. M. Crafts.

The authors have previously shown that the vapor-density of aluminium chloride is constant between 288°, and 400°, and corresponds with the formula Al_2Cl_6. Deville and Troost's experiments with ferric chloride gave results corresponding with the formula Fe_2Cl_6, but the later determinations of V. Meyer and Grünewald have shown that between 440° and 1300° the vapor-density is always lower than that corresponding with Fe_2Cl_6, and agrees more nearly with the formula $FeCl_3$. There is always, however, a want of agreement between the observed and calculated values, because at temperatures above 518° the ferric chloride decomposes into ferrous chloride and chlorine. The authors point out that Meyer's results do not agree at all well with the formula $FeCl_3$, and consider that above 750° the ferric chloride dissociates into Fe_2Cl_4 and Cl_2, whilst the further reduction of density observed above 1052° is due to the partial dissociation of Fe_2Cl_4 into $2FeCl_2$. The boiling point of ferrous chloride and its vapor-density are, however, not yet known.

The modification of Dumas' apparatus employed by the authors makes it easy to ascertain whether dissociation has taken place and any crystals have been deposited. They find that, contrary to the statement of Meyer and Grünewald, ferric chloride in an atmosphere of nitrogen is dissociated into chlorine and ferrous chloride, the latter being deposited in almost colorless crystals which do not recombine with the liberated chlorine on cooling, nor after remaining in contact with it at the ordinary temperature for several days. The ferrous chloride is not volatile at 440°, and hence the volume of gas in the apparatus is not altered in consequence of the dissociation.

In order to prevent the dissociation, the apparatus was filled with chlorine, and hence it became necessary to determine the relative density of this gas at the temperatures employed. The chlorine was made in some experiments from manganese peroxide and hydrochloric acid, in others from potassium dichromate and hydrochloric acid, and was dried by means of sulphuric acid. The following results were obtained :—

Temperature............	19·7°	21·6°	23·0°	356·9°	440·0°
Sp. gr......................	2·479	2·458	2·475	2·451	2·448

---

[1] *Compt. rend.*, cvii., 301–306; reprinted from *Jour. Chem. Soc.*, 1888, p. 1251.

Between 21° and 357° the coefficient of expansion of chlorine is to that of air as 1·009 : 1·000.

The experiments with ferric chloride were made in the same way as those with aluminium chloride. Relatively low temperatures were employed, and the quantity of the salt used was such that chlorine was always present in considerable excess. The ferric chloride volatilized completely and not a trace of ferrous chloride was formed. Ferric chloride boils at 280—285°, and melts under pressure at 301°. The following results were obtained:—

Temperature.......	321·6°	325·2°	356·9°	357·0°	442·2°	442·2°
Vapor-density.....	11·41	12·47	12·04	11·85	11·66	11·30

Between 321° and 442° the vapor-density is practically constant, and corresponds with the formula Fe_2Cl_6.

NOTE ON SYRUPUS CROCI.

By C. J. S. Thompson.

Although saffron is not now regarded of much value as a therapeutic agent, the syrup is still frequently used and prescribed in medical practice of to-day, in many parts of the country. The official tincture, which is presumably retained in the Pharmacopœia on account of its coloring properties, is very seldom used, but there seems to be a want of a good formula for the preparation of a satisfactory syrup.

A century or more ago saffron occupied an important position in the Pharmacopœias of the countries of Europe, and was considered useful as an emmenagogue, and also for its stomachic and antispasmodic properties, doubtless due to the action of its volatile oil.

We meet with it in the form of aqueous and alcoholic extract, infusion, spirit, aqueous and vinous syrup, tincture and wine. When prepared in the usual way by means of sugar simply dissolved in a watery infusion, the product does not keep satisfactorily, and does not long remain bright and clear. The following formulæ, taken from several old Pharmacopœias and Dispensatories, are interesting :—

No. 1. (German)—

℞ Saffron..	1 oz.
Boiling water..	1 pint.
Refined sugar..	2½ lbs.

Macerate the former in a covered vessel for twelve hours, then filter the liquid, and form a syrup with the sugar.

No. 2. (1720)—

℞ Oriental saffron	ʒvj.
Boiling water	℥x.

Infuse for three days in a closed vessel, express, and dissolve in the infusion—

White sugar	1 lb.

No. 3. (Van Mons)—

℞ Saffron	1 part,
Water	8 parts.

Infuse for six hours in a water-bath and express; again infuse the residue in water, 8 parts, mix the two strained infusions, and add—

White sugar	28 parts.

and make a syrup.

No. 4. (France)—

℞ Croci	1 oz.
Vin Malaga	1 lb.

Macerate for two days, then express lightly; set the liquor aside, decant and add—

Sacch. alb.	1 lb. 10 oz.

make a syrup.

The following formula can be recommended as producing an excellent syrup of good color:—

℞ Saffron	ʒiij.
Boiling water	℥x.
White sugar	1½ lb.
Rectified spirit	℥iss.

Infuse the saffron in boiling water for six hours and strain; set aside till cold, then heat to the boiling point and filter. Dissolve the sugar in the filtrate by means of gentle heat, and when cold add the rectified spirit. The product will be found to keep well, and remain bright and clear without precipitating.—*Phar. Jour. and Trans.*, January 5, p. 526.

Zinc cyanide is recommended by Dr. Laschenwitsch (*Jour. de Méd.*) in certain affections of the heart, and seems to be particularly valuable in cases where digitalis, convallaria, etc., irritate the digestive organs. The dose is from five to six milligrammes in the twenty-four hours. The salt must not be confounded with the ferrocyanide, which is probably useless for the above purpose.

LINIMENTUM OPII AMMONIATUM.

By M. Conroy, F. C. S.

This liniment, according to the recent edition of the B.P.C. Formulary, is made by mixing together 6 fluidounces each of soap liniment, compound camphor liniment and tincture of opium, and 1 fluidounce each of liniment of belladonna and stronger solution of ammonia, with directions to "mix, and after standing a week, filter quickly;" while in the first edition of the Formulary the directions to the same formula were simply "mix and filter." When made by this latter plan I have invariably noticed that a crystalline deposit takes place after a few days' rest, from which it would appear that the object of the instructions contained in the last edition of the Formulary is to allow this separation to take place before filtering. This crystalline deposit resembles morphine very much, and as 20 fluidounces of the liniment contains 6 fluidounces of tincture of opium, equivalent to 198 grains of powdered opium or to 19·8 grains of morphine, it seemed very probable, considering the presence of caustic ammonia, that morphine would crystallize out. With the object in view of determining the nature of the deposit, I sealed up a bottle last May, made to the directions of the old Formulary, by simply mixing and filtering right off, and did not open it until yesterday. This bottle contained 20 fluidounces, and after syphoning off the clear liquor, the crystalline deposit was thrown into a small filter, drained, and freed from adhering liniment by washing with a little proof spirit. After drying at 212° Fahr. the weight was found to be only 2·1 grains, and I was somewhat surprised to find that the crystals were not morphine, nor did they even yield a trace of morphine to the usual delicate tests for that alkaloid. They were only very slightly soluble in water, and the solution gave a white precipitate with barium chloride insoluble in nitric acid. Heated to redness on platinum foil, a slight charring occurred, due probably to extractive matter, as the crystals were of a yellow color, and a white ash remained, which was nearly all soluble in water. This solution gave the violet potassium flame test, and a little of the solution placed on a watch glass, with a drop of solution of platinic chloride, gave a small crop of crystals on standing a few hours. There were also very slight traces of calcium and of meconic acid. This result, I must confess, came to me as an agreeable surprise, for I have looked upon this liniment since its introduction as an incompatible mixture; but it is very evident from this that the solvent action of the alcoholic medium is quite sufficient to hold the morphine in solution. Although these results are of a negative character, they are well worth recording, as no doubt others have observed this crystalline deposit and have possibly come to the same conclusion as myself, and they also show that the Formulary Committee have been well advised in directing the liniment to stand a week before filtering.—*Phar. Jour. and Trans.*, Dec. 1, p. 442.

RÉCAMIER TOILET POWDER.

"Guaranteed free from lead, bismuth and arsenic. The finest powder ever manufactured. Will not make the face shine."

Sample packages of this powder have been distributed by mail. A chemical and microscopical investigation of the preparation shows its composition to be oxide of zinc mixed with starch.

C. B.

PHOTOGRAPHY.

By F. V. Butterfield.

(*Continued from page* 48.)

The result of all this work is a negative, from which as many copies as required may be taken by the process of printing. The conventional term "negative" may possibly puzzle some, so I will just explain *en passant* that it is so called in contradistinction to a "positive," which is a picture in itself, whilst a "negative" is only the means of making one; in the latter all the lights and shades are reversed; it is always examined by transmitted light, the former by reflected light.

As stated in a previous portion of this paper, wet-plate photography seems well adapted for taking "positives," and the peripatetic photographer, a well-known character in all popular places of resort, does not by any means lose sight of this. Another common form of the collodion positive is the ferrotype, possibly familiar to you under the name of "American Gem" portraits, the only difference being in the substitution of a thin sheet of enamelled iron for the ordinary glass plate.

The gelatin-bromide process is similar in principle to the above, but here gelatin is used in the place of collodion for holding the sensitive silver salts *in situ*, the advantage being that the plates can be prepared a great length of time before using; and also after exposure, they may be kept for a lengthened period, prior to development, a fact of no little importance, when on a tour abroad, for instance; but the most striking feature in connection with its use is that the gelatin in some way or other appears to act splendidly as a most energetic sensitizer, so that the part it plays may not be entirely mechanical, and thus the slowest gelatin dry plate on the market is twenty times more rapid than the old wet-plate, whilst those devoted to instantaneous work are about sixty times more sensitive.

The preparation of these plates requires special apparatus, and as they can now be bought so very cheaply, it would not repay an amateur to make them, so, having obtained a supply, the next step is to draw on them a picture by the aid of light, or in other words, to take a photograph.

Now a ray of ordinary light can be split up by dispersion into a series of different colors, commencing with red and ending in violet, the latter being the most refrangible, the former least so, and the spectrum so obtained also possesses three different properties, calorific, illuminating and chemical. The heating effects reside chiefly in the red rays, illuminating in the yellow' whilst the violet and some still more refrangible or ultra-violet rays constitute the chemical or actinic properties, and it has been proved that the decomposition of silver salts by light is almost entirely due to these actinic rays. Thus we are enabled to do all our work, such as preparation of the plates, development, etc., with impunity in a deep ruby light, which has no palpable effect on the most rapid gelatin. But it will now also be apparent to you that it is no easy matter to take a good photograph of, say, a fair sitter, possessing lovely blue eyes and red hair, or an individual furnished with a liberal supply of yellow freckles, or say, a painting where all the varied colors of the spectrum are blended together in one harmonious whole; but for work of this sort special plates are prepared called "orthochromatic," in which the sensitive film is stained with some aniline dye; an ammoniacal solution of eosin or tetrabromfluorescein has been found to answer extremely well, and plates prepared with it are the subject of a patent.

Any object which reflects yellow or red, will appear almost black when reproduced by photography, whilst any shade of blue is almost equivalent to white. These facts must be borne in mind when calculating the time requisite in exposure.

The lenses employed must, of course, be rendered achromatic. This is easily effected by a combination of flint and crown glass, but, as they can not be entirely freed from spherical aberration, we are obliged to use diaphragms to cut off the outer rays, in order to obtain pictures sharp and crisp all over.

Cameras are made in a variety of shapes and sizes. With regard to the latter I recommend the half-plate size, as it is not too cumbersome to become a nuisance when touring, and enlargements can be easily made on the "bromide" paper sold for the purpose, if required. The shape should be square, having a reversing frame, swing back and rising front. The first is very useful, from the fact that we can take a photograph, with the plate held in either a horizontal or vertical position, instead of having to alter the position of the camera as of yore. The swing back is brought into play, whenever it is necessary to tilt the camera, serving to keep the plate as nearly as possible in a perpendicular plane, whilst the rising front will sometimes obviate tilting the camera, etc. The bellows should be extensible to twice the focus of the lens, so that the camera may be also used for copying other photographs, etc.

Three double backs are usually provided with each camera. These are light-tight, and the first operation is to fill them with the dry plates. This, as I explained, must only be done in a non-actinic medium. If a proper dark room cannot be fitted up, the darkest place possible should be secured, and all work, such as development, etc., always reserved till night, when by the aid of the ruby lamp there is no difficulty whatever. The packet of quarter plates is then opened in this red light, and carriers are provided to enable the half plate dark slide to be used for any smaller plate; so the quarter plate having been placed in the rabbet of the "carrier," film side down, and secured, the camera is next mounted on its tripod stand.

Portraits require some experience in "lighting," posing, etc., before they can be taken at all satisfactorily; it is better to commence, therefore, with some simple object, such as a building. Having taken up some coign of vantage uncap the lens, and with the cloth drawn over your head to keep out extraneous light, proceed to focus. Owing to the rectilinear propagation of light the image of the object of course appears upon the screen in an inverted position. In a portrait it is usual to focus the eyes of the sitter only, but for a landscape generally the foreground, in order to get the effect of distance, whilst the arrangement of the picture itself will call into requisition your artistic tastes and abilities.

Having thus got the object into as sharp focus as possible, by means of the rack and pinion adjustment, recap the lens, withdraw the screen, and in its place insert the dark slide containing the gelatin dry plate. Now comes the most important operation, that is, *exposure*. No hard and fast rule can be given for this, it is gained only by experience and practice: with an ordinary dry plate, doublet lens, and nicely diffused light, two to three seconds may be considered the average time to give, but on this occasion only draw out the shutter of the dark slide to one-third its length and give one second; then draw it out another third, being careful not to disturb the position of the camera, and give another second; finally, expose for one second more when drawn out to its full extent.

There will thus be, on that one plate, the results of three exposures of one, two and three seconds each.

The next step is the *development* of the photograph. For this purpose many different solutions have been suggested and used from time to time, but the one I always use recommends itself for simplicity, and has the great advantage of working well with almost any maker's plate. One has, moreover, considerable control over it during development, its action being easily modulated to suit either "over" or "under" -exposed plates.

℞ Am. bromid.	ʒss.
Liq. am. fort., ·880	ʒj.
Aq. ad.	℥x.

Misce.

For a quarter plate take 1 ounce of the above, and immediately before using add to it 2 grains pyrogallol; for a half plate use, of course, just double the amount.

The reason for adding the "pyro" at the last moment will be obvious, being simply because its alkaline solution so rapidly absorbs oxygen from the air, that it is soon rendered useless as a "developer." Sulphites have been used to prevent this, but it is really very little trouble to add the pinch of "pyro" at the last moment.

Developing solutions containing pyrogallol have a nasty habit of staining everything, linen, hands, etc., with which they come in contact, said to be due to the formation of metagallic acid, and recently Capt. Abney has suggested the substitution of hydroquinone for it. These bodies are closely related chemically, the former being, of course, trihydroxybenzene $C_6H_3(OH)_3$ and the latter dihydroxybenzene $C_6H_4(OH)_2$. In the reaction during development the latter is simply oxidized to quinone, which crystallizes in light yellow crystals, and is thus devoid of this evil habit of discoloring everything.

$$C_6H_4(OH)_2+O=\underset{\text{Quinone.}}{C_6H_4O_2}+H_2O,$$

but it does not appear to answer the purpose quite so well as the former.

Hydroxylamine hydrochlorate $NH_2OH.HCl$ has also been pressed into the service of photography, in this capacity, but during the process of development, nitrous oxide gas N_2O is liberated, causing little cracks in the film, and the potassium, or sodium hydrate, which must necessarily be used with it, has a softening action on the gelatin. Its mode of action is perhaps expressed by the following equation:

$$4Ag_2Br+2NH_2OH.HCl+6NaHO=$$
$$8Ag+4NaBr+2NaCl+7H_2O+N_2O.$$

Another developer, very largely used, is one with ferrous oxalate, made by adding large excess of neutral potassium oxalate to ferrous sulphate,

$$K_2C_2O_4+FeSO_4=FeC_2O_4+K_2SO_4.$$

In the process of development the ferrous salt is raised to ferric at the expense of the silver salt, which is reduced to the metallic state, forming the image, thus—

$$6Ag_2Br+6FeC_2O_4=12Ag+Fe_2Br_6+2Fe_2(C_2O_4)_3.$$

And so we might go on enumerating the different developing solutions, each having its own supporters, who laud the virtues of their own particular "developer" sky-high; but, as I said before, let the amateur stick to the alkaline pyro-developer, and first thoroughly master the action of that. He can then afterwards try the others, and decide the matter to his own satisfaction. In this developer the ammonia acts as an accelerator, the bromide as a restrainer, whilst the pyrogallol is the reducing agent; therefore, if we have reason to believe, prior to development, that the plate was slightly *over* exposed, we must add a little more bromide to the developing solution, or if *under* exposed, a drop or two of the strong liquid ammonia ·880.

It will appear from the above equations that the chief action of the developing solution is to rob the silver salt of its halogen, and thus reduce it to the metallic state, it having first of all undergone some change by the action of the light, whereby its affinity for the halogen is in some way or other impaired, and rendering it thus more easily reduced. This reduction must take place in a very gradual manner indeed, or the resulting negative would otherwise be very harsh and utterly devoid of that beautiful gradation and softness so necessary for the production of a good print; hence the use of a bromide in the developer, although *how* it acts as a restrainer is not exactly known, but it appears in some way or other to assist the silver bromide in resisting the action of the developer.

Some pyro developer having been made, as soon as night sets in again light the ruby lamp, and take the plate on which the three exposures were made out of the dark slide. On looking at it no apparent change has taken place; it appears precisely the same as when first put in; but if the instructions given have been strictly followed a faithful representation of the subject lies latent on the correctly-exposed part, and the next step is to make it visible. Placing the plate in a small dish or tray, film side up, pour on the developer evenly, gently rocking the dish to and fro during the whole time. Now, supposing two seconds to have been the *correct* exposure, then the portion of the plate which received *three* seconds will rapidly flash out, whilst the two seconds part gradually unfolds itself, first the high lights, as sky, white objects, etc., and then the detail in the more shaded parts, whereas on the portion exposed for one second only it will be some time before any change at all is perceptible, then, very slowly indeed, the high lights will become visible, but there will be no detail whatever.

In practice, therefore, as soon as the plate has been flooded with the developer, it is a very easy matter to tell whether the exposure has been correct or otherwise.

As soon as it is thought that all the detail is well out the plate must be rinsed in a little clean water, and put into the fixing bath, which is another dish containing a solution of sodium thiosulphate.

℞ Sod. thiosulph. . . . . ℥iv.
Aq. ad. . . . . Oj.
Misce.

Immediately the creamy appearance (due to the unaltered silver bromide) observed at the back of the plate has entirely disappeared this operation is complete, and it only remains to thoroughly wash the plate in order to remove all traces of "hypo," and place it in a rack to dry. The result is a negative, and from it as many copies as desired may be taken by one of the many different processes of "printing;" for instance, it can be done either in silver, platinum, uranium, iron, or chromium salts, but as the first-mentioned is the oldest and most popular to-day, I shall confine my remarks to that.

(*To be concluded.*)

VARIETIES.

Helleborein as a local anæsthetic.—Venturini and Gasparini (*Internat. klin. Rundschau*), found by experiments on rabbits and dogs, that instillations of weak solutions of helleborein ($\frac{1}{70}$ gr. per drop) into the conjunctival sac cause after about 15 minutes anæsthesia of the cornea; half an hour after the first application the first signs of returning sensibility appear. Pupil, eyelids, acuteness of vision, intra-ocular pressure, remain unaffected; no symptoms of irritation are observed. *Extract of Strophanthus*, too, is said to possess anæsthetic properties.—*Med. Chronicle*, Nov. 1888.

Saccharin used in place of cane sugar.—R. Kayser found glucose and saccharin—but no cane sugar—in four samples of raspberry syrup, in five liqueurs and in six samples of candy. Starch syrup sweetened with saccharin has likewise been observed. To detect the adulteration a few drops of diluted sulphuric acid are added to the substance, if necessary triturated with water; the liquid is then agitated with a mixture of equal parts of ether and petroleum benzin; the residue left on evaporation is dissolved in a little warm water, and tested for salicylic acid, and by its intensely sweet taste for saccharin.—*Chem. Repert.* 1888., p. 101.

Chromic Acid in Excessive Sweating.—A circular has been sent to the Prussian Army medical officers, advocating chromic acid as an economical and efficient means of checking excessive perspiration. In hyperhidrosis of the feet the application of a ten per cent. solution, repeated every three or six weeks, is sufficient to prevent any inconvenience from this source.—*Medical Press; Med. News, Nov.* 17, 1888.

Liniment for Burns.—As an application for burns, the *Centralbl. für Therap.* suggests the following:

℞.—Ol. olivæ	6 parts.
Salol	1 part.
Aquæ calcis	6 parts.—M.

Med. News, Nov. 24, 1888.

Incompatible antiseptics.—The *Journal de Médecine* directs attention to the following incompatibilities: Corrosive sublimate and iodine; corrosive sublimate and soap; soap and iodine; carbolic acid and iodine; carbolic acid and permanganate of potassium; salicylic acid and soap; salicylic acid and permanganate of potassium; permanganate of potassium and oils, soap or glycerin.

Hydrochlorate of Apomorphine was employed by Dr. Stocquart, of Brussels, in coughs characterized especially by frequency and difficult expectoration. The dose is only three or four milligrams, dissolved in water, in the twenty-four hours. It is advisable to add a few drops of hydrochloric acid to the solution, as it is liable to rapid alteration; the acid does not affect its therapeutic value.—*Journal de Médecine.*

Meco-narceine a New Hypnotic.—Dr. Laborde reports in the *Bull. de l' Acad. de Méd.*, that in conjunction with Dr. Duquesnel he has obtained from opium a new alkaloid to which he has given the name of méco-narceine. He claims for this preparation, that it produces a quiet sleep, only slight contraction of the pupils, slight anæsthesia, no headache, and no disturbance of the digestive tract.—*Med. News*, December 8, 1888.

Myrtol.—Dr. Eichorst recommends the internal administration of myrtol to overcome putrefactive processes of the air-passages. It is administered in two grain capsules, two of which are taken every two hours. It can be continued for weeks without causing any bad after-effects. Not only does it ameliorate the gangrenous odor of the expectoration, but diminishes also the quantity of the expectorated material. It does not stay the progress of the tuberbulosis.—*Med. News*, Dec. 29; see also AMER. JOUR. PHAR., 1886, p. 299.

Benzoated Chloroform.—Dr. B. W. Richardson recommends the use of benzoated chloroform as an antiseptic of considerable service in the treatment of fœtid wounds. It is made by dissolving three drachms of pure benzoic acid in twelve ounces of chloroform, and filtering if necessary. After the bandage has been applied a fluid drachm of the solution is poured over or near the ulcer, the deodorizing effect being of the best character. The solution is also effective for removing the fœtor in troublesome cases of fœtid exhalations from the feet; and used like eau de Cologne, it is advantageous to rub over the hands at a post mortem examination, and for similar purposes where a disinfectant is required.—*Asclepiad*, Vol. v. No. 10.

Action of Antipyrin on the Teeth.—Dr. Galippe, a dentist, finds that antipyrin taken internally has the effect of blackening the teeth. Teeth which, previous to the administration of this drug, had lost their enamel, blackened sooner than otherwise healthy teeth. The discoloration is only temporary as it can be removed by cleansing the teeth with water containing an abundance of oxygen.—*Deutsche med. Woch.; Med. News*, Dec. 8, 1888.

MINUTES OF THE PHARMACEUTICAL MEETING.

JANUARY 15th, 1889.

The meeting having been called to order, Wm. B. Webb, Ph. M., was asked to preside.

The minutes of the last meeting were read and no corrections being required they stand approved. Donations to the library being in order, the Year-book of Pharmacy for 1888, was presented; this book is a resumé of the state of pharmacy, issued by the British Pharmaceutical Conference and bears much the same relation to the British Conference that the report on the progress of pharmacy does to the Proceedings of the American Pharmaceutical Association.

Professor Maisch presented to the cabinet of the College a specimen of *Mezereon root*; in some parts of Europe the bark of the root is preferred, but that in the market is nearly all obtained from the stem.

Professor Maisch exhibited specimens of *white seneka root*, which had been recently sold in New York as true senega; he stated that some years ago this root was quite common in the market and that he believed it to be obtained from Polygala Boykinii, but that he had been unable to ascertain the locality of its collection, though on a former occasion the commercial article had been traced to Southern Missouri.

Mr. McIntyre called attention to the fact that the *tar* usually supplied to the trade now is quite different from that of old time pharmacy; it is put up in tins and labelled "steam refined tar;" the odor is much the same, but it will not mix with fatty bodies, shows whitish specks through the mixture and when strained it clogs the strainer. Mr. Meyer stated that he had the same experience as Mr. McIntyre; inquiries about the origin showed that the tar now sold usually comes from North Carolina, but formerly the supply was from New Jersey; a city firm which sells it largely refused to give any satisfactory information in regard to its origin or manufacture. Most of that which is put up now in cans bears the label of James Good, and different jobbers seem all to be supplied with the same article: formerly it came in small kegs of about one or one and a half gallons. It was suggested to refer this subject to a committee to report at a future meeting.

Professor Maisch read a paper upon *Mistura Glycyrrhizæ Composita* by J. Harry Buckingham, Ph. G.

Mr. McIntyre in noticing the paper said that he would hesitate about using ammonia as it altered the character of the preparation by neutralizing the free acids, and further that attempts to improve the appearance had not given much satisfaction as customers were used to a muddy, brown looking preparation instead of a clear, deep red article.

F. X. Mœrk read a paper upon "Tests for *Oil of Cotton Seed.*" In the discussion which followed it was stated that *oil of ben* was not the same as sesamum, but was an abbreviation of behen, which was a species of moringa.

Mr. Beringer said he had used a mixture of fuming nitric and sulphuric acids and water as a test. Bechi's test contains amylic alcohol and rape-seed oil with nitrate of silver; but it has been proven that amylic alcohol is not essential to the test. The opinion was freely expressed that most of the commercial olive oil contains cotton-seed oil, and perhaps other bland oils, like rape-seed and mustard-seed oils which were formerly mixed with olive oils. One of the members present who was formerly largely engaged in the manufacture of lead plaster said that at one time they were very much troubled with olive oil that would not yield a satisfactory plaster, that partial saponification seemed to take place and some principle was present which left the plaster sticky.

Prof. Maisch read a paper upon the *Soluble Gum of Tragacanth*, which was elicited by some queries which pointed to a difference between the statements of the Pharmacopœia and of other works. Dr. Lowe said he had tried these experiments and could confirm them.

The above papers were referred to the Publishing Committee.

The question about tar was referred to Dr. Lowe, who promised to report as soon as possible, though probably not at the next meeting.

Mr. Webb said that for preparing *Ointment of Tar*, he had been in the habit of using about one part of wax in twelve parts of the ointment, which gave a better consistence. There being no further business, on motion adjourned.

T. S. Wiegand,
Registrar.

EDITORIAL DEPARTMENT.

The Meeting of Pharmacists on the Pacific Coast.—When the American Pharmaceutical Association, at its meeting in Detroit, resolved to meet this year in San Francisco, a committee was appointed to select a suitable date and to make the necessary traveling arrangements. About the middle of January the committee announced July 15th next as the date for the beginning of the meeting; but subsequently reconsidered this action, and fixed upon Monday, June 24th, for convening the meeting. It must be expected that the convenience of every member could not be secured by the selection of any date; but it is to be hoped that the day, now finally agreed upon, will suit a very large number of those intending to be present, and that those who for various reasons would have preferred a later date will use their best endeavors to make their convenience suit the date.

In a short time the committee will announce particulars as to the traveling arrangements made for the accommodation of the members and their friends.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Angewandte Pflanzenanatomie.—Ein Handbuch zum Studium des anatomischen Baues der in der Pharmacie, den Gewerben, der Landwirthschaft und dem Haushalte benutzten pflanzlichen Rohstoffe. Erster Band. Allgemeiner Theil. Grundriss der Anatomie. Von Dr. A. Tschirch, Docenten der Botanik an der Universität Berlin. Wien und Leipzig: Urban & Schwarzenberg, 1889. Large 8vo., pages xii. and 548.

Applied vegetable anatomy. A hand book for the study of the anatomical structure of the vegetable raw material used in pharmacy, the arts, in agriculture and in the household. First volume. General part. Outlines of anatomy.

In our volume for 1885 (page 637) we noticed Professor Flückiger's "Principles of Pharmacognosy," and in that for 1887 (page 219) a translation by Professor Power of the same work, for the second edition of which the part relating to the morphology and anatomy had been especially prepared by the author of the volume now before us. While the former work was written with the special view of its application to drugs, the field of the present one is much larger, as indicated in the title, though the aim of the two works, in relation to anatomy, is substantially alike, except that the present one enters more into the details of the rich results of the researches by numerous scientists. The work is not intended as a text-book for the study of vegetable anatomy as such; but it aims at imparting the theoretical knowledge required for the successful practical application of the microscope to the investigation of vegetable substances for other than strictly botanical purposes. This object has been faithfully kept in view in restricting as much as possible the discussion of subjects, which are of importance to the botanist, but have little significance for practical application; and in extending the descriptions of anatomical elements of practical importance considerably beyond the necessities of the botanist. This practical object resting upon the broad basis of science is also noticeable in the numerous wood cuts, of which the volume contains 614, every one of which is artistically executed, and with very few exceptions, illustrates some portion of a drug or of material used in the arts.

Aside from the introductory portion giving also the microchemical reagents, the methods of preparation, apparatus, etc., the work is divided into two parts treating respectively of the cell and of the tissue systems. The first part occupying a little less than one half of the book is again divided into two sections, of which the first treats of the cell contents, taking up the formless nitrogenated contents, protoplasm, then the nitrogenated contents having a distinct shape (nucleus, aleuron, chromatophores), the non-nitrogenous contents (fat, starches, salts) and the cell sap with its organic and inorganic constituents. The second section treats of the cell wall, its morphology, optical behaviour and chemical nature, followed by brief chapters on cell formation, cell forms and cellular tissue.

The second somewhat larger part is entitled "Anatomic-Physiological Systems," and is subdivided as follows: 1. meristemes; 2. epidermal system including trichomes and cork; 3. mechanical system (bast, libriform, collenchyme, sclereïds); 4. absorption system (roothairs, haustoria, mycorhiza); 5. assimilation system (palisade cells, leaf structure); 6. conducting system (ducts, tracheids and conducting parenchyme as the elements for conveying water; sieve tubes with the accompanying cells, cambiform, milk tubes and conducting parenchyma as the elements for conveying plastic material; the different kinds of fibro-vascular bundles and the endoderm; then the secondary growth in thickness, including bark, wood, etc.,); 7. ventilating system (intercellular spaces, stomata, lenticels); 8. storage system (storage organs and reserve material); 9. secretion and excretion system (glands, and resin-,oil-,mucilage-,etc., cells; schizogenic and lysigenic excretion receptacles, and laticiferous ducts).

The work is excellent in conception and execution, instructive and incentive, and of lasting value to students as well as to all those using the microscope for the examination of vegetable substances.

Universal-Pharmakopöe. Eine vergleichende Zusammenstellung der zur Zeit in Europa und Nord Amerika gültigen Pharmakopöen von Dr. Bruno Hirsch. Göttingen: Vandenhœck & Ruprecht.

Universal Pharmacopœia. A comprehensive comparison of the pharmacopœias at present in force in Europe and North America.

A universal pharmacopœia, intended to cover the wants of all civilized countries, would be a visionary undertaking; but in the present case the title is used in an entirely different sense, differing also from that of older works like those by Jourdan, Geiger and Mohr. While these authors based their works upon the pharmacopœias then in existence, they, at the same time, admitted also numerous drugs and galenicals not recognized by any pharmacopœia then in use, and their works must be regarded more in the light of comprehensive dispensatories, or of general repertories similar to that more modern and at the same time more national one by Dorvault, entitled l'Officine. But the work before us is intended to embrace only the pharmacopœias now in existence, and to give the contents of each in such a manner that every subject and every detail contained in one or more of them can be readily compared, pointing out the differences in statements and requirements, and supplying criticisms based upon the author's extensive researches and practice. The work is therefore by far more than a mere comparison of different pharmacopœias; and while on the one hand it supplies the strongest arguments in favor of an "international pharmacopœia," with the view of securing unification in the strength of at least the important medicines, it likewise furnishes much valuable and useful material for the revision of the individual pharmacopœias.

The arrangement is strictly alphabetical the leading titles being those adopted by the German Pharmacopœia, or of an analogous nomenclature, in case the article be not recognized there; the titles adopted by other pharmacopœias are given as official synonyms. The text does not consist of mere abstracts placed side by side, but for each article has been moulded by the author into a continuate and homogeneous narration of all the statements or important directions given by the various authorities. Clear in diction, concise in statements, comprehensive in scope, mild but precise in criticism: the author presents a work which is a monument to his knowledge and zeal, and of inestimable value to the pharmacists of all civilized countries.

About two years ago the first volume was completed containing accounts of 1850 pharmacopœial drugs, chemicals and pharmaceuticals. For various reasons the printing of the second volume was delayed, but during the last five or six months, four parts of the second volume have been published, containing upon 368 pages nearly 900 different articles, the last one being No. 2374 "Pasta caustica." There will be no delay in the publication of the remainder, and the whole of the second and last volume is expected to be issued during the approaching spring.

The Art of Dispensing: A treatise on the methods and processes involved in compounding medical prescriptions. Published at the office of *The Chemist and Druggist*, London and Melbourne, 1888. 12mo. Pp. 280.

A very useful book which can be recommended and deserves to be consulted by dispensers. It begins with "general suggestions" to dispensers, discusses, "weights and measures," the relation of "prescribers and dispensers," "special drugs," etc., and then, proceeds to the consideration of the various classes of medicines, closing with chapters on incompatibles, dispensing foreign prescriptions, new remedies, homœopathic dispensing and illegible prescriptions. The practical aims of the author are obvious upon every page and as a rule the information and advice given are trustworthy. In some cases, however, we would differ from the author; thus we think that—in the United States, at least—aqua menthæ directed in prescriptions is intended for spearmint water, but not for peppermint water (p. 19.) To a mixture containing a bismuth salt and magnesia in water the addition of gum (p. 24) cannot be recommended; syrup or glycerin is preferable if not otherwise inadmissible. We regard the extemporaneous preparation of aromatic waters from an alcoholic solution of the oil as justifiable if intended for immediate use, but not for large quantities (p. 33) to be kept in stock, because they soon turn acid. The powdering of quinine sulphate (p. 41) is of questionable utility, because it destroys the physical character of the salt, and renders it still more prone to loss of water of hydration. Silver nitrate dissolved in pure distilled water and kept out of contact with organic matter remains unchanged in the sunlight, and neither amber-tinted nor blue-glass bottles are necessary for the preservation of the solution. In the putting up of prescriptions doubtless many a dispenser would differ in the use of excipients, the order of admixture, etc.; but it must be remembered that there are usually more ways than one for accomplishing a given object.

The appendix contains a number of examination prescriptions, reproduced for practice by students, because they generally present special difficulties. Next follows a list of terms likely to occur in French and German prescriptions, and a list of abbreviations used in prescriptions, both being pretty complete. A full index of 14 pages in double columns facilitates reference to the different subjects.

The external appearance of the book in regard to paper, proof reading and printing is in keeping with its contents—commendable.

Handbuch der praktischen Pharmacie für Apotheker, Drogisten, Ærzte und Medicinal-Beamte. Bearbeitet von Prof. Dr. H. Beckurts und Dr. Bruno Hirsch. Zweiter Band. Stuttgart: Ferdinand Enke.

Handbook of practical pharmacy for apothecaries, druggists, physicians and medical officers.

In notices of the first volume of this work, contained in preceding volumes of THE JOURNAL, we have explained its scope, arrangement and general character. The two fascicles before us bring the second volume to page 192, commencing with No. 681 Faba Calabarica, and containing in alphabetical order nearly three hundred and fifty articles, the last one being No. 1028 Liquor Aluminii acetici. The same care and accuracy, noticed in the preceding volume, characterize also the text of the present numbers.

Pictorial History of Ancient Pharmacy, with sketches of early medical practice. By Hermann Peters. Translated from the German, and revised with numerous additions by Dr. Wm. Netter. Chicago: G. P. Engelhard & Co., 1889. 8 vo. Pp. 184. Price $2.

Mr. Peters' work attracted a good deal of attention in Europe as a most valuable contribution to the history of pharmacy; being written in the German language it was inaccessible to those not conversant with that tongue. We are glad, therefore, that through Dr. Netter's translation it has been rendered in English, retaining, as much as is possible in a translation, all the attractive quaintness of the original, and reproducing in a commendable manner its illustrations. But in order to render it more inviting in its new home the translator has amplified the text by the addition of many features of interest, without materially altering the style and arrangement. In this garb it will doubtless be consulted with great interest by pharmacists and physicians as well, as by the student of history. As stated before the translation has been faithfully done, and the interpolated parts have been very judiciously incorporated. Perhaps it might have been desirable to indicate in the body of the work those portions which have been added to the original, in addition to the brief references made in the preface; and it would certainly not have detracted from the interest or value, if proper credit had been given in all cases. For instance, the account of Chinese pharmacy on pages 16 and 17 has been taken from the valuable paper contributed by Mr. Stewart Culin to the AMERICAN JOURNAL OF PHARMACY, and published in the volume for 1887, p. 593.

Aside from the shortcomings indicated we heartily recommend the work to our readers, feeling assured that its attentive perusal will not merely satisfy idle curiosity. The external appearance of the book—binding, paper and typography—is also quite attractive.

Year-book of Pharmacy, comprising abstracts of papers relating to Pharmacy, Materia Medica, and Chemistry, contributed to British and foreign Journals from July 1, 1887, to June 30, 1888; with the Transactions of the British Pharmaceutical Conference at the twenty-fifth annual meeting, held at Bath, September, 1888. London: J. & A. Churchill. 8vo.; pp. x and 505.

Proceedings of the American Pharmaceutical Association at the thirty-sixth annual meeting, held at Detroit, Michigan, September, 1888. Also, the constitution, by-laws and roll of members. Philadelphia: Published by the American Pharmaceutical Association. 8vo; pp. xii and 700. Also, The National Formulary. Pp. xii and 176.

Of these two valuable annual publications the former appeared about four or five weeks ahead of the latter, which will be issued during the first week of February. The volume of the Proceedings—without the Formulary—is nearly half as large again as the Year-book. The minutes and papers read cover in the former 196, and in the Year-book 156 pages, and the abstracts from Journals (Report on the Progress of Pharmacy), 405 and 249 pages respectively.

In relation to the Proceedings, it should be mentioned here that the Publication Committee has greatly reduced the price of the older volumes, and in addition thereto allows large discounts on these reduced rates when two or more volumes are ordered at the same time. It is hoped that many members will avail themselves of this offer for completing their sets of Proceedings, which, as works of reference, will always retain their value.

Chemical Lecture Notes.—By Peter T. Austen, Ph. D., F. C. S., Professor of general and applied chemistry, Rutgers College, and the New Jersey State Scientific School. New York: John Wiley & Sons. 1888. 12mo. Pp. 98. Price $1.

This is a rather unique little volume treating of various questions belonging to chemistry which often give more or less trouble to the student, and which are discussed and explained in a lucid manner adapted for the use of the average student. Amongst the subjects may be mentioned the following, as showing the intention of the author: atoms, molecules, atomicity, valence, affinity, rests, acids, bases, salts, etc. A few headings are followed by blank spaces for notes by the student. The topics have not been arranged in any particular manner, but follow one another without any apparent order or relation. However the little book is a useful one in the direction indicated above; and we believe the author's hope to be well founded "that some of the subjects considered may prove of interest and of value to those students who study, not to pass, but to know."

Third annual Report of the State Board of Health and Vital Statistics of the Commonwealth of Pennsylvania. Transmitted to the Governor, December 3, 1887. Harrisburg, 8vo. Pp. 338.

This report has been published much more rapidly than its predecessor, which was noticed in our last number. Though the volume now before us is smaller, it has been prepared with like care, and contains some valuable contributions to sanitary science.

Dose and Price Labels of all the drugs and preparations of the United States Pharmacopœia of 1880, together with many unofficinal articles that are frequently called for as medicines or used in the arts. With an appendix containing a description of many of the new remedies lately introduced. For the use of Pharmacists, Physicians and Students. By C. L. Lochman. Third edition, revised and enlarged. Philadelphia: Dunlap & Clarke. 1889. Pp. 201.

The appearance of the third edition proves the practical utility of these labels, as we indicated on noticing the previous editions. The present one differs from the second edition mainly in the correction of a few typographical errors, and in making the formulas for unofficinal preparations correspond with those of the National Formulary, without, however, giving labels for all of the latter. More than forty new or recently re-introduced remedies—in addition to those contained in the second edition—are briefly described in the appendix.

Fitting Glasses.—A Manual for the use of Opticians, Jewelers, Druggists and others who sell glasses. Philadelphia: Jas. W. Queen & Co. 8 vo., pp. 96.

The object of the pamphlet is to give instruction as to the proper methods of fitting spectacles. The descriptions and instructions appear to be clear and precise, so as to be readily understood by intelligent persons, and the 47 illustrations serve materially in explaining the various details.

Proceedings of the National Wholesale Druggists Association, in convention at Saratoga, September 11–14, 1888. Geo. B. Bower, official stenographer. Minneapolis, 1888. 8 vo. pp. 240.

The volume contains, as usual, the minutes, discussions, reports, etc., and as a frontispiece has a very good portrait of the present president, Mr. Geo. A. Kelly, of Pittsburg.

THE AMERICAN
JOURNAL OF PHARMACY.

MARCH, 1889.

ASCLEPIAS CORNUTI AND ASCLEPIAS TUBEROSA.

By Fred. B. Quackenbush.

Read at the Pharmaceutical Meeting, February 19.

An analysis of Asclepias tuberosa was made in 1861 by Elam Rhoads,[1] who announced the presence of a peculiar principle possessing the taste of the root which he obtained from a concentrated infusion of the drug by precipitation with tannic acid.

In 1881, W. L. Hinchman[2] observed in Asclepias Cornuti a crystalline principle, but obtained it in a different manner. He treated the drug with petroleum ether, evaporated spontaneously and treated the residue with 95 per cent. alcohol from which yellow wart-like crystals were deposited which after purification were white. List, in 1849, also separated a crystalline principle from the milk juice by exhausting the congealed juice with ether.

The Asclepias Cornuti used in the following analysis was collected and carefully dried by Prof. Henry Trimble during the summer of 1888.

A complete analysis of the Ascelepias tuberosa was not made, but it was examined for the purpose of learning if the crystalline principle which was found in the Asclepias Cornuti also existed in it.

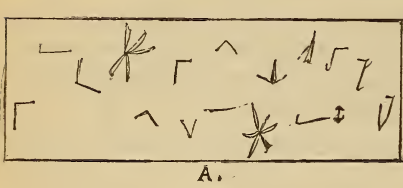
Fifty grams of the powdered root were macerated with petroleum ether in several portions. This solution showed a distinct fluorescence similar to that observed in petrolatum, and yielded on evaporation 1·44 per cent. of a peculiar residue supposed to consist of caoutchouc, resin and volatile oil to the extent of 2 per cent. This residue was insoluble in 95 per cent. alcohol, slightly soluble in absolute alcohol, and very soluble in ether and chloroform.

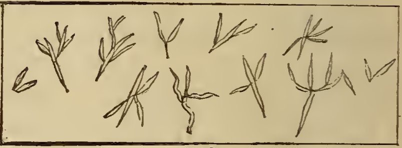
---

[1] Amer. Jour. Phar., 1861, p. 493.

[2] Amer. Jour. Phar., 1881, p. 433.

The residue of the drug was next treated with stronger ether in the same manner as with the petroleum ether. This ethereal solution gave the same fluorescence as the petroleum ether and yielded on evaporation 1·3 per cent. of residue. This residue was treated successively with water, water containing 1 per cent. hydrochloric acid and with water made slightly alkaline with potassium hydrate. The former gave no response to tests for glucosides, alkaloids or gallic acid. The second, which gave a distinct test for glucosides, on being neutralized with sodium hydrate deposited a flocculent precipitate. This solution containing the precipitate was agitated with stronger ether, which on spontaneous evaporation deposited a small quantity of crystals, which upon recrystallization assumed the form shown in Fig. A.


A.

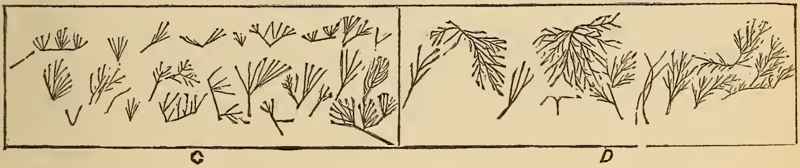

B

The alkaline solution gave negative tests as in the case of the aqueous solution.

One hundred grams of the powdered root of Asclepias tuberosa were macerated in petroleum ether and stronger ether and the residue from the ether solution treated with acidulated water as in the case of the Asclepias Cornuti. From this solution crystals were obtained by agitation with ether and evaporation of the ethereal solution. These crystals upon recrystallization from ether had the form as shown in Fig. B.

The residue of the Asclepias Cornuti was next exhausted with absolute alcohol. This alcoholic solution also showed the fluorescence as noted in the other solvents and yielded 3·58 per cent. of residue, which was completely soluble in water, and was taken up in that liquid and the tests applied for tannin and alkaloids with negative results. It, however, responded to the tests for glucosides. The aqueous solution was then agitated with petroleum ether, ether and chloroform. The ether and chloroform solutions both deposited crystals which recrystallized from ether in the form shown in Fig. C. The aqueous solution after treatment as stated above was made alkaline and again agitated with the same solvents. I obtained no crystals from these solutions, but the petroleum ether gave a peculiar residue, having an odor analogous to that of musk, and which is probably the odorous principle observed by Rhoads in 1861.

The residue of the Asclepias tuberosa was next exhausted with absolute alcohol, and the alcoholic solution treated in the same manner as was the Asclepias Cornuti. The aqueous solution of the residue upon agitation with ether and evaporation of the ethereal solution yielded crystals which, on redissolving in ether, crystallized from that liquid in the form shown in Fig. D. The crystals obtained from both the ether and alcohol appear to be one and the same compound. The crystals all reduced Fehling's solution and gave the following color reactions:



(*a*) With sulphuric acid they gave first a brown color, gradually changing to a blackish brown.

(*b*) With sulphuric acid and bichromate potassium they assumed at first a deep brown color, but on allowing to stand thirty minutes a purple color was produced which was very distinct in thin layers.

(*c*) Nitric acid after some time produced a slight pinkish color.

(*d*) Hydrochloric acid and ferric chloride developed no change of color.

This principle exists in the drug in very small quantities, only enough being obtained from one hundred grams of the drug to make the tests as given above.

The residue of the Asclepias Cornuti was then treated successively with water, a weak alkaline solution, a 1 per cent. acid solution and chlorine water.

In these solutions were found, by the usual methods of detection and estimation, sugar, 5·16 per cent., of which 3·29 per cent. was saccharose. Mucilage, 3·6 per cent.; trace of dextrin; albuminoids, 2·4 per cent.; calcium oxalate, 2·75 per cent.; coloring matter, 8·92 per cent.

The drug contained 7·16 per cent. of moisture and 5·35 per cent. of ash. The drug, after exhausting with all the solvents, was found to consist of 49·86 per cent. of cellulin and lignin.

The results of the analysis may be summed up as follows:

Petroleum ether extracted		1·44	
Ether extracted		1·30	
Absolute alcohol extracted		3·58	
		——	6·32
Water—	Saccharose	3.29	
	Glucose	1·87	
	Mucilage	3·60	
	Undetermined compounds	3·22	
		——	11·98
Alkaline solution			3·91
Acid solution			4·36
Chlorine water			8·92
Moisture			7·16
Ash			5·35
Cellulin and Lignin			49·86
Loss			2·14
Total			100·00

In addition to the above, starch was also found, but was not estimated.

This drug contains many of the usual plant constituents, also caoutchouc, and a crystalline glucoside having a slightly bitter taste, and also resembling the taste of the root. This principle is probably identical with the bitter principle observed by Hinchman in 1881, and possibly the same principle observed by Rhoads in 1861. The fluorescence noted in the alcoholic and ethereal solutions I believe to be due to the glucoside found, although I did not obtain it in sufficient quantity to fully establish this fact.

Rhoads and Hinchman also announced the presence of tannin, but I was unable to verify their statement. It was not observed in the course of the regular analysis, and special tests with the powdered drug failed to confirm its presence.

Poisoning with oil of sassafras.— A case is related in the *Cincinnati Lancet-Clinic*, December 8, 1888, by Dr. L. M. Albright, when a teaspoonful of the oil was taken by a young man, producing hallucinations, vomiting, prostration, cold extremities, low pulse, somewhat dilated pupils and stupor. The treatment commenced two hours after taking the oil, consisted in rest, heat to the extremities, and egg-nog. The patient soon regained consciousness, and was ready for breakfast the next morning.

IMMATURE CUBEBS.

By C. B. Lowe.

Read at the Pharmaceutical Meeting, February 19th.

One of the wholesale firms of this city lately received from a New York importer a sample of what was represented to be cubebs. They are about one-third the size of true cubebs, with a stipe about one-third longer than their diameter, are of a dark purple color, quite shrunken appearance, and of a cubeb odor, but much weaker taste.

On examination with the microscope they are seen to contain numerous oil cells in the mesocarp, but the layer of stone cells which forms the endocarp in the true cubebs can not be discerned.

They contain a very rudimentary seed. In my opinion they are cubebs which have been picked while quite immature, the present high price of cubebs, probably, having tempted the growers to put them upon the market in this condition.

ON THE COMPOSITION OF HYDRANGIN.

By Hermann J. M. Schrœter, Ph. G.

A contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.
Read at the Pharmaceutical Meeting, February 19th.

A proximate analysis of Hydrangea arborescens, and a description of the active principle, hydrangin, was published in the Amer. Jour. of Pharmacy, March, 1887, by C. S. Bondurant. He showed the principle which he had discovered to be a glucoside, and gave a process for preparing it, but was unable to pursue his investigations. The object of this paper is to continue this work and determine the ultimate composition of this interesting compound.

Five kilos of the finely powdered drug were percolated to exhaustion with 96 per cent. methyl alcohol. The alcohol was recovered by distillation in vacuo, and the dark-brown extract further reduced by placing over sulphuric acid. Various experiments were made on the best method for extracting the principle. A portion of the extract was treated with petroleum ether to remove fat, etc, but it was found that this solvent dissolved an appreciable quantity of the principle, therefore this treatment was omitted with the bulk of the extract. The residue was then treated with successive portions of a one per cent. aqueous solution of sulphuric acid. This solution was colored reddish, and to remove coloring matter was treated with chloroform, which solvent also extracted some of the principle. The acid solution was next treated with ether, and upon evaporation the slightly reddish colored hydrangin was deposited. To further purify, it was dissolved in absolute alcohol and treated with animal charcoal. This colorless solution was then evaporated under reduced pressure, and upon recrystallization from the same solvent, the principle was deposited in well-defined stellate clusters of pure white crystals. The drug used was apparently of poor quality, the yield being only 0·08 p. c.; it was stated by Mr. Bondurant to probably contain about 0·8 to 1 per cent. of the glucoside.

Some of the crystals were pulverized and dried over sulphuric acid. On heating to 110°C, no loss occurred, showing absence of water of crystallization. Tests for nitrogen gave negative results.

Four combustions with cupric oxide gave following results.—

	1.	2.	3.	4.	mean	Calculated for $(C_{34}H_{25}O_{11})\times$.
C.	67.05	66·85	66·97	66·84	66·93	66·99
H.	4·03	4·05	4·31	4·19	4·14	4·10
O.	28·92	29·10	28·72	28·97	28·93	28·91

Experiments on the physical and chemical properties of hydrangin compared well with those stated by Mr. Bondurant, with but few exceptions. Its melting point was found to be 228°C., instead of 235°C., and the solidifying point at 217°C. Mention was also made that hydrangin dissolves in concentrated sulphuric acid without color. On dissolving a portion in concentrated H_2SO_4, a distinct violet red fluorescence was observed, although not quite as strong at that produced by an alkali, which is intense opal blue. On addition of 5 volumes of water to the solution in H_2SO_4, the fluorescence was destroyed; the addition of ammonia to the same solution destroyed the color also, but on neutralizing the solution, the characteristic opal blue fluorescence reappeared. The substance was also found to be soluble in 80 per cent. acetic acid with slight fluorescence, which became more decided on dilution with 5 to 10 volumes of water.

The decomposition product of hydrangin, obtained by boiling with a dilute acid, was found to be soluble in chloroform, which deposited it as a brownish resin-like body.

BROMATES OF THE CINCHONA ALKALOIDS.

By Claude Grant Johnson, Ph. G.

From an Inaugural Essay.

Bromates have of late been receiving some attention as therapeutic agents, although they have not yet come into any general notice. Almost all of the inorganic compounds of bromic acid have been made, but none of its alkaloidal salts seem to have been produced until quite recently. It is claimed for the bromates of the metals that they give all of the effects of the corresponding bromides with the advantage of being more gratefully received by the system, which is able to endure them for a longer time without the unpleasant after effects usually following upon an extended treatment. They have been used in chorea, epilepsy, alcoholism and other diseases with good results. "They are for the most part crystallizable, but many of them decompose when their solutions are heated. When heated to redness, they either give off oxygen, leaving bromides, or give off bromine, and part of their oxygen, leaving oxides."—(Watts).

Barium bromate is important as being the salt from which most of the others are prepared. It is best made by adding to a boiling solution of potassium bromate, sufficient anhydrous acetate of barium to saturate it, and allowing to cool slowly. Barium bromate crystallizes out, while potassium acetate remains in solution.

Potassium bromate was prepared by adding bromine to a solution of potassium hydrate, forming the bromide and bromate of potassium, the bromate crystallizing from the solution because of its inferior solubility ("KBr is soluble in 1·6 parts of water, $KBrO_3$ in 16·2 parts."—Walker). The bromide remaining in solution was procured as bromate by adding the requisite quantity (calculated from the molecular weights) of potassium hydrate, and passing a stream of chlorine gas through the solution until saturated, when the bromate separated in small, irregular shaped crystals, the reaction being as follows:

$$KBr+6\ KOH+3\ Cl_2=KBrO_3+6\ KCl+3\ H_2O.$$

The product was purified by recrystallization. The shape of the crystals depends upon the way in which they are made, from hot solution they separate as needles, but by slow cooling are obtained as four and six-sided plates, colorless and anhydrous.

Quinine bromate has been successfully used in some forms of neuralgia, "especially those in which evidence existed of malarious or rheumatic influence," the large proportion of easily dissociated oxygen present being supposed to add to its physiological activity. These salts were all prepared by double decomposition between barium bromate and the corresponding sulphates, and a sample of each is presented. On platinum or porcelain, heated to redness, they are decomposed with explosive violence, leaving a very slight charred residue. Barium bromate was dissolved in boiling water, a calculated amount of sulphate of quinine added, and the mixture filtered. The filtrate was of a violet blue color, a circumstance I am unable to explain, the suggestion being offered that it may be due to a compound allied to thalleioquin. Almost immediately, the solution being concentrated, crytals began to separate in small clusters. These were redissolved in a large quantity of water, and set aside for a few days, when the product was procured in the form of handsome stellate clusters of long, white acicular crystals. These were dried upon filtering paper. Exposed to the air for nearly a month, they did not effloresce nor undergo any noticeable change. The solubility in water is very slight, as is indicated by the rapidity with which crystals form. The taste is bitter, and the reaction slightly acid. Dropped upon a heated porcelain lid, the crystals decompose immediately with a slight explosion. Upon concentrating the mother liquor the blue color was much deepened, and the second crop of crystals had a violet tinge, which can be removed by solution and crystallization. A repetition of the process in somewhat more dilute solution gave the same results, except that the solution was but very slightly colored at first, but the crystals were no better, and upon concentration the color was again produced.

Cinchonidine bromate was next prepared, the same process being used. This also gave a blue colored solution, but the salt was found to be much more soluble than the preceding, requiring a very concentrated solution before crystals would form. The first that were procured were tested for quinine, but none was found. The easy solubility of the salt, together with the color complication, made the procuring of white crystals a matter of considerable difficulty. By renewed trials with fresh materials, and recrystallizing the products repeatedly, a fairly good specimen was secured. The best plan would probably be to evaporate a moderately dilute solution spontaneously in a cool place or in vacuo. In heating the solution to concentrate it, care must be taken to see that the process be not carried too far, as decomposition is likely to take place and the salt to be spoiled, even if it does not go off in a sudden explosion. These crystals are not as handsome as those of the quinine bromate; they are white and in clusters, but are much smaller than the others, and the separate crystals are flatter and broader.

Cinchonine bromate.—In preparing this salt the color of the filtrate was observed to be yellow, and remained so, becoming very little deeper, even after much concentration. The salt, while not as difficultly soluble as the quinine, is more so than the cinchonidine salt, but the product has a slight yellow color. The bunches are smaller and differ in shape from the quinine salt, but are larger than the cinchonidine. They give the usual tests for bromates, are bitter, and neutral to test paper.

Quinidine Bromate.—The color of the solution was a delicate shade of pink, but as soon as heat was applied, it began to change and became blue, the color rapidly deepening into almost a black. In a second attempt, the barium solution being saturated, the pink color was again obtained. No heat was applied but after two days the solution was found to have changed to the same blue color. This salt was also very hard to crystallize, on account of its easy solubility, and the difficulty caused by the change in color, but a product was finally obtained that is colorless. The crystals are very much like the others, being needle shaped, and forming in clusters, explosive on hot porcelain, and of a neutral reaction.

If these salts should come into use as remedies, they could be easily prepared by the above process. It is possible that the differences in solubility shown by the bromates could be made useful as a means of distinguishing the alkaloids of cinchona from each other. Lack of time prevented me from looking into this feature of the subject, but it is worthy of further investigation.

FRAUDULENT "HEAVY CALCINED MAGNESIA."

To the Editor of the American Journal of Pharmacy:

Some time ago we were offered by an importing house in a neighboring city what appeared to be a very handsome article of "Heavy Calcined Magnesia," it being represented as such by the seller, with the statement that it was of English manufacture. We analyzed the sample, and thinking an error had been made by the vendors, procured another sample from them and subjected the same to another analysis, with the following result:

Calcium Sulphate	79·00
Water	20·70
Magnesium Oxide	0·30

Thus showing the so-called "English Heavy Calcined Magnesia" to be nothing more nor less than hydrated Plaster of Paris.

As the article comes upon the market through a reputable house, who have since written us that "they did not offer it as a C. P. article," we feel that the general trade should be warned of the fraud through the medium of your journal, and a warning given against the eternal running after "cheap" drugs, so much in vogue in these days of "cutters," and the placing of such goods in stock without first making the most critical examination. This so-called "Heavy Magnesia" is very handsome, and therefore well calculated to deceive the unwary. Respectfully, &c.,

KEASBEY & MATTISON.

CHEMICAL NOTES.

Abstracts from Theses.

Liquor Ferri chloridi.—Albert E. Oerter prepared, experimentally, five solutions, following strictly the directions of the pharmacopœia, varying the process in experiment II by leaving the acid and iron in contact for 48 hours, then placing the flask in a sand bath, connecting the flask with a Liebig's condenser and returning the acid distillate into the flask. In each of the experiments 45 grams of iron were used, consisting of card teeth in I and II, reduced iron in III, and iron clippings, sold for preparing solutions of iron, in IV and V. The iron left undissolved was rapidly washed and at once dried, when it weighed, respectively, 4·6, 4·5, 4·5, 4·0 and 5·0 gm. After oxidation the iron solutions were clear with the exception of III from which a substance had to be filtered which was insoluble in water and boiling nitric acid. The specific gravity of each solution was taken and the amount of ferric oxide determined from 10 gm. Three commercial samples of solution of ferric chloride were examined in the same manner, the results being as follows:

Sample.	I.	II.	III.	IV.	V.	VI.	VII.	VIII.
Spec. grav.	1·386	1·386	1·344	1·411	1·405	1·407	1·328	1·374
Fe_2O_3	1·73	1·73	1·56	1·85	1·84	1·84	1·65	1·70 gm.

Tinctura Ferri chloridi was procured from different stores by Walter Culin, Ph. G. None of the samples gave a reaction for ferrous salt with potassium ferricyanide; eight of the samples gave reactions for nitric acid, and traces of other metals, like zinc, were detected in the same number.

The effect of Sodium chloride upon mercurous chloride was studied by John L. D. Morison, Ph. G., in the following manner: Three beakers were placed in a water-bath for five or six hours at a temperature of 40° C.; each beaker contained a mixture of 2 gm. calomel, 6 gm. sodium chloride and 30 cc. distilled water; to one was added 2 cc. hydrochloric acid, and to another a solution of pepsin acidulated with hydrochloric acid. The light was carefully excluded. On testing the liquids no mercuric chloride was found; but the acidulated pepsin solution contained a small amount of calomel (?), which caused a deposit of mercury upon bright copper foil, and this, on being heated in a tube yielded a sublimate of metallic mercury which, with a fragment of iodine, formed the red iodide.

A mixture of calomel and sodium chloride suspended in milk was next introduced, by means of a rubber tube, directly into the stomach of a dog. After one hour the dog was killed with chloroform; the stomach with contents was digested with ether, the ethereal solution distilled, the residue freed from fat by petroleum benzin, and then exhausted with boiling distilled water; this solution was free from mercury.

Iodides of Mercury.—Robert I. Eads, Ph. G., recommends for the preparation of the red iodide to use the mercuric chloride and potassium iodide in exact molecular proportion, whereby loss is avoided. The color of the green iodide seems to be affected, aside from exposure to light, by the temperature resulting from the combination of the two elements, a darker color with a brown tint being produced on effecting the combination rapidly with the development of heat.

On heating solutions of mercuric nitrate with excess of iodine bright red scales are obtained after cooling. A concentrated solution of mercurous nitrate heated with excess of iodine acicular crystals of a yellowish color with a pink tint were obtained; dissolved in alcohol and the solution evaporated spontaneously, scarlet crystals resulted.[1]

---

[1] A number of compounds of mercuric nitrate with iodide, varying in color between white and red, have been described by Preuss, Souville and others.—EDITOR.

Yellow crystals of mercurous iodide were obtained by the process recommended by Stroman (*Berichte,* 1887, p. 2818) by boiling mercurous nitrate with excess of iodine. On washing the crystals with water, they are converted into a red powder.

Salicylate of Cinchonidine was prepared by Sherman L. Carroll, Ph. G., by precipitating cinchonidine from its sulphate, dissolving it in a hydro-alcoholic solution of salicylic acid and evaporating. The solution had a strong tendency to creep over the sides of the dish and the salt had a reddish color. Satisfactory results were obtained on precipitating solutions of cinchonidine hydrochlorate and sodium salicylate, drying the precipitate, dissolving in alcohol, filtering through animal charcoal, and crystallizing.

TINCTURE OF MUSTARD.

By Joseph W. England, Ph. G.

Read at the Pharmaceutical Meeting, February 10th.

Internally as an emetic, and externally as a rubefacient, mustard has held popular pre-eminence, as a safe and efficient remedy, from the earliest period; and it is strange to note that, although it has been used with unvarying success in the directions mentioned, any preparations of it have never, apparently, been employed for internal administration.

It is possible that the disinclination to use preparations internally may have arisen through a belief that any such compounds must necessarily partake of its emetic-producing properties. This idea is an erroneous one. It is now recognized that the emetic qualities of ground mustard seeds are dependent for their exciting cause upon the minute particles enveloping, or having adherent to them, particles of the acrid and volatile principles of mustard, which act, mechanically, as local irritants to the mucous membrane of the stomach, and thus cause a revulsive action, and that it is not due to any centric influence.

Believing, then, that mustard in the form of a tincture would possess valuable stimulating properties, the writer prepared, over a year ago, an alcoholic preparation of this drug and urged its medicinal employment, especially in those conditions which are graphically expressed by the term "drunk-cases." It was found to answer admirably. Possessing the aromatic qualities of ginger and the sharply stimulating properties of capsicum, it combined in one the excellencies of both, without the local irritant feature so characteristic of capsicum. It was found to be stronger than tincture of ginger and less active than tincture of capsicum; standing, apparently, midway in medicinal activity between the two.

Mustard, as is well known, depends for its medicinal activity upon a fixed, acrid oil—acrinyl sulphocyanide, and sulphate of sinapine, in the case of the white seed, and a volatile liquid—allyl sulphocyanide in the case of the black seed. None of these principles preexist in the seeds as such, but are the results of decomposition by a ferment—myrosin—in the presence of water, of certain proximate principles, sinalbin in the one instance and sinigrin in the other, very much in the same way that amygdalin and emulsin in bitter almonds are broken up when brought in contact with water, to form hydrocyanic acid.

In the preparation of the tincture, the ground commercial black mustard seed which has had the larger portion of its 20–25 per cent. fixed oil removed by pressure, has been used. The formula is as follows:

Take of

Ground black mustard	8 troy-ounces.
Water	2 fluidounces.
Alcohol	q. s. ad 1 qt.

Moisten the mustard with the water, added in small quantities at a time, in a porcelain evaporating dish or other non-metallic receptacle, and admix thoroughly. Cover well and leave stand for 24 hours. Remove and pack in a glass funnel or percolator; add 1 pint of alcohol and macerate for 48 hours. Then allow percolation to proceed, keep adding alcohol until the percolate measures 1 quart.

The finished liquid is a clear, transparent, yellow fluid, having a strong characteristic odor and a warm pungent taste. Mixed with water it becomes slightly opalescent or milky from the precipitation of a small quantity of fixed oil. Its dose is from $\frac{1}{4}$–$\frac{1}{2}$–1 teaspoonful well diluted with water.

Aluminium acetate, in addition to its antiseptic property, has also resolvent powers, and was used by Dr. Grosch (*Berl. Klin. Woch.*, 1888) in the abortive treatment of furuncles, the irrigation being made with a 20 per cent. solution.

PREPARATIONS OF MUSTARD FOR INTERNAL USE.

By J. M. Maisch.

Tincture of mustard prepared as suggested by Mr. England, appears to be a preparation deserving the attention of physicians, and it is probable that its effects may vary somewhat as the white or the black mustard is used in making it, and that the tincture of black mustard cannot be fully represented by a solution of the volatile oil of mustard in alcohol. Liquid preparations of mustard for internal use have been employed until the beginning of the present century; but at the present time their use is very limited. Still formulas for such preparations can be found in modern works, most or all of them based upon such as were in use about a hundred years ago.

The "New London Dispensatory" (edition 1676), after lauding the medicinal effects of *Sinapeos*, states: "Steep'd in Rhenish Wine, and the Wine drank for some Days (℔ 1 to a Quart) it helps the Dropsy *Tympanites*, and is very good against Epilepsies, Carus and Lethargy."

The "Pharmacopée universelle," by A. J. L. Jourdan (Paris, 1828), quotes a number of authoritative formulas, from which the following are selected:

VINUM SINAPIOS; COLLUTORIUM SINAPI.

	i.	ii.
Bruised mustard seed	℥ss.	℥i.
White wine	lb. i.	lb. i.
Macerate for six hours and filter.		
Add tincture of cinnamon	—	℥ii.

The first formula is credited to the Wurzburg Pharmacopœia of 1796, and the second to Augustin's "Pharmacopœa extemporanea" (Berlin, 1822). Used as a sialagogue and internally in dropsies.

SERUM LACTIS SINAPINUM, *s.* CUM SINAPI.

Cow's milk	lb. ij.
Bruised mustard seed	℥ij.

Boil together until coagulated, then filter.

This preparation is credited to the pharmacopœias of Holland (1805; Niemann's additions), Hessia (1806), Lippe (1794) and Sardinia (1773). An improved formula recommended by Swediaur (1817) was as follows:

Cow's milk	lb. i.
Mustard seed	℥i.

Triturate together gradually; then add a sufficient quantity of Rhenish wine, coagulate by heat and strain.

Recommended in arthrodynia, gout and paralysis; one or two pounds are to be consumed during the night.

A number of formulas are also given in which beer or ale is used as the vehicle; but these all contain other drugs in addition to mustard.

Formulas similar to, or identical with the above, are also given in Geiger-Mohr's Pharmacopœa universalis; but as indicated by the types used for them, these preparations were at that time but rarely employed. Yet in a work as recent as Bernatzik and Vogl's "Arzneimittellehre" (Vienna, 1886) it is stated that mustard is occasionally, though rarely, used as a diuretic in the form of *serum lactis sinapisatum*, prepared from ground mustard 50 gm. and milk 1 liter.

Dorvault, in "L'Officine," quotes only a few of the old formulas which appear to be rarely, if ever, employed in France. But Hager, in "Pharmac. Praxis," gives in addition to various others a formula for

SYRUPUS SINAPIS.

Simple syrup	100 parts.
Spirit of mustard	1 part.

Dose, a tablespoonful, in bronchial catarrh.

Spiritus Sinapis of the German Pharmacopœia is a solution of one part of volatile oil of mustard in 49 parts of alcohol.

Aqua Sinapis, which was formerly prepared by macerating black mustard in water and distilling, is recommended by Hager to be made by dissolving one drop of the volatile oil of mustard in 250 gm. of distilled water.

PHARMACEUTICAL NOTES.

Abstracts from Theses.

Fluid Extract of Apocynum.—Jas. Webb Beckwith, Ph. G., experimented with different menstruums and ascertained that one composed of three parts of alcohol, and one of water, and containing 10 per cent. of glycerin yielded the best results. Operating upon 200 grams of the powdered drug, the reserved portion measuring 170 cc., was perfectly clear; after evaporating the weak percolate to the consistence of a soft extract, dissolving this in sufficient of the menstruum, and adding to the reserved portion, a flocculent matter was separated rising to the surface and leaving the liquid clear.

On percolating the drug with the same mixture of alcohol and water, omitting the glycerin, the percolates were nearly clear until the evaporated portion was added to the reserved liquid, when it became turbid. A mixture of two parts of alcohol and one of water yielded a percolate from which a precipitate separated, which was increased on the addition of the evaporated portion. The percolate of the drug obtained with diluted alcohol was cloudy and deposited a precipitate.

Syrupus Rhei aromaticus.—John H. Bear, Ph. G., proposes the addition of a little borax whereby a clear and apparently unobjectionable preparation is obtained. For one ounce avoirdupois of the aromatic tincture of rhubarb 18 grains of borax are used.

Bases for Unguentum Iodi.—Charles W. Cannon, Ph. G., has experimented with lard, lanolin and petrolatum as the base for iodine ointment; and after keeping the ointments under various conditions in the dark, or exposed to diffused daylight or to sunlight determined the amount of iodine by dissolving it in alcohol and estimating it with volumetric solution of sodium hyposulphite. Lanolin and lard yielded the iodine to the solvent quite readily, while petrolatum persistently retained a portion of it. The largest amount of iodine was invariably recovered from the lanolin, and this is recommended as the best base for iodine ointment; the well known qualities of lanolin furnish additional reasons for its use in this connection.

Unguentum Aquæ Rosæ.—William Stengelin, Ph. G., furnishes the following formula, which is stated to yield an excellent preparation:

Expressed oil of almond	4 ounces.
White wax	1 ounce.
Spermaceti	6 drachms.
Distilled water	1½ ounces.
Oil of bergamot	5 drops.
Otto of rose	5 drops.

In order to obtain it of a light, frothy consistence it is recommended to beat it with a wooden stirrer having a perforated blade, which should be dexterously worked, and is afterward readily cleaned.

Fluid extract of viburnum, in doses of ʒi, has been given in Bellevue and other hospitals against vomiting of pregnancy, with uniformly successful results.

NOTE ON THE MOLYBDATE TEST FOR HYPOPHOSPHITES.[1]

BY E. J. MILLARD, Pharmaceutical Chemist.

In several text-books of pharmaceutical chemistry, and also in the National Dispensatory by Stillé and Maisch, ammonic molybdate is stated to give a blue precipitate with hypophosphorous acid and the hypophosphites. No details of the reaction are given, although it is recommended as a test.

As far as I have been able to ascertain, the test is founded on the observations of Winkler,[2] at least he is the earliest authority on the subject, for in 1850 he mentions that hypophosphites are colored blue by molybdate of ammonium, and that a mixture of phosphate with hypophosphite yields a green coloration, owing to the combination of yellow phosphomolybdate with the blue.

Now, in common with many others, I have never been able to get a blue precipitate, when solutions of the two bodies are mixed, and only a faint coloration appears after standing some considerable time, nor does the fact of the solution of the molybdate being acid, neutral or alkaline, make any difference in this result.

Whilst experimenting with solutions of ammonic molybdate and hypophosphites, I noticed that the addition of a small quantity of sulphurous acid rendered the inoperative test a most delicate one. Moreover, the ordinary nitric acid solution of molybdate of ammonium, used as a test for phosphoric acid, answers even better than a neutral or alkaline solution. For, if to a solution of hypophosphorous acid or any of the hypophosphites the acid solution of ammonic molybdate be added, and then a few drops of sulphurous acid, a blue precipitate is immediately formed, or if the solution be dilute, a blue colorationis produced which is considerably intensified by agitation or gentle warming.

Phosphoric acid and the phosphates, phosphorous acid and the phosphites similarly treated do not react, neither do pyrophosphates.

The reaction is, I believe, due to the partial reduction of MoO_3 to Mo_3O_8 by the hypophosphorous acid, which is completed by the sulphurous acid. This blue oxide has been shown by Pfordten[3] to exist between colorless MoO_3 and brownish MoO_2.

---

[1] Reprint from the PHARMACEUTICAL JOURNAL, Jan. 26, 1889; communicated by the author.

[2] Poggendorff's "Annalen d. Physik u. Chemie," Band cxi., p. 443.

[3] *Journ. Chem. Soc.*, Abstracts, 1884, page 559.

It may be thought that any reducing agent, as SH_2 or $SnCl_2$, would answer equally well, and perhaps reduce the molybdate without the presence of hypophosphorous acid being necessary. These reagents, however, carry the reduction too far, namely, to the brown state.

Alkaloids, including morphine, and most salts, with the exception of chlorates, sulphides and thiosulphates, do not affect the reaction.

Chlorates prevent the reaction, sulphides produce a brown-black coloration that would completely hide it, and thiosulphates reduce the molybdate to the brown state. Each of these, however, if treated by boiling well with dilute acid, preferably hydrochloric, cooling and then adding the reagents, will react properly. Excess of alkali prevents the coloration showing until acidified; strong mineral acids spoil the reaction, but dilute acids fail to interfere. Boiling causes the precipitate and color to disappear, but if cooled again and more sulphurous acid added the color reappears.

In pure solutions the reaction is very delicate, it being possible on gently warming to detect 1 part of H_3PO_2 in 2000, whilst the well-known cupric reaction fails completely.

In mixtures and in the presence of acids, etc., about 1 in 300 is the limit. It forms a splendid lecture experiment, as the color is very fine and deep.

I may add that ammonic tungstate reacts in exactly the same manner as the molybdate does.

GLEANINGS FROM THE GERMAN JOURNALS.

By F. X. Mœrk, Ph. G.

Boroglycerides.—E. Hirschsohn has studied the products obtainable by using various molecular ratios, and finds the following to give most satisfactory results: *Boroglyceride,* distinguishable by its solubility in two parts 95 per cent. alcohol and in twelve parts water, is made by heating on a sand-bath 62 parts boric acid (1 mol.) and 95 parts glycerin (1 mol.) until a portion removed becomes solid on cooling. *Sodium boroglyceride,* 38 parts powdered borax (1 mol.) and 38 parts glycerin (4 mol.) gave a pale yellow vitreous mass, completely soluble in two parts alcohol and also in two parts water. *Calcium boroglyceride,* made, owing to the variable nature of commercial calcium borate, by taking freshly slaked lime 7·4 parts (1 mol.) and boric acid 24·8 parts (4 mol.), mixing intimately and heating with 76 parts glycerin (8 mol.); solubility same as Na compound. *Magnesium boroglyceride* made in the same manner as the preceding, magnesia 4 parts (1 mol.), boric acid 24·8 parts (4 mol.), glycerin 76 parts (8 mol.). This compound, very soluble in alcohol and water, appears under the name of "Antifungin," as an aqueous solution of some merit in throat affections.

The use of more glycerin in these preparations yields hygroscopic products, more boric acid or borate, less soluble products. If the metallic compounds be treated with ether or acetic ether, they are decomposed into boric acid, soluble in the menstruum, and a compound of the base with glycerin which is insoluble in the ethers, but afterwards is readily soluble in water, the solution possessing an alkaline reaction.—*Pharm. Ztschr. f. Russl.*, 1889, 1, 17.

Alkaloidal Tests.—Acetate of *brucine* in dilute solution with lead dioxide gives after a short time a red coloration; acetate and oxalate of *apomorphine* in dilute solutions on addition of lead dioxide or hydrated manganese dioxide, a cherry-red color.—*Chemiker Ztg.*, 1889, 95.

Electrode indicator, a test paper to indicate the negative pole of an electrical machine can be made by impregnating turmeric or red litmus paper with sodium chloride; its use depends upon the separation of metallic sodium, which rapidly in presence of water forms sodium hydrate; if the moistened paper is touched by the negative pole a brown or blue spot, according to the paper used, at once appears. A commercial indicator consists of blotting paper saturated with sodium sulphate and phenolphtalein, which is turned red by the negative pole.—*Pharm. Centralh.*, 1889, 16.

Pyrodine and Acetphenylhydrazid.—According to investigations of Prof. Dreschfeld the latter if pure is four times as active as the former, the dose being, for adults, 0·12–0·18 gm. (2 to 3 grains). These two substances, hence, are not, as generally believed, identical; pyrodine being a crude product containing acetphenylhydrazid.—(*Therap. Monatsh.*) *Pharm. Ztg.*, 1889, 15.

Iodoform.—B. Fischer in studying the action of solvents upon this body finds that, if *pure iodoform* be dissolved in solvents free from dissolved air and without access of air, the solution will keep of a light yellow color so long as air be excluded; if air be admitted decomposition takes place in a few minutes attended by liberation of iodine. The presence of certain substances retards this decomposition; these substances (impurities) may be present in the solvents from which iodoform is recrystallized, thus contaminating the crystals, or they may be present in the solvents; such substances as retard the change, if present in minute quantity, are hydroquinone, pyrogallic acid, aniline, pyridine bases and aldehyde.—*Pharm. Ztg.*, 1889, 31.

Fluorescence.—E. Geissler examined a yellow powder used for destroying the fluorescence of petroleum oils in the proportion of 0·2–0·3 gm. for 100 cc. oil; it proved to be *nitro-naphthalin.* Nitrobenzol also possesses this property although not to such a marked degree. The interesting observation was made that the fluorescence of quinine salts was destroyed by a little of these chemicals. If light be made to traverse solutions of these substances it will not produce the fluorescent effect either upon quinine solutions or petroleum oils; this is explainable by the possible absorption of the blue rays by nitro-benzol and nitro-naphthalin.—*Pharm. Centralh.*, 1889, 11.

Russian turpentine from Pinus sylvestris contains about thirty per cent. of a crystalline acid $C_{40}H_{58}O_5$ obtainable by extracting the turpentine with 50–60 per cent. alcohol and treating the granular residue with boiling alcohol, which solution solidifies to a crystalline mass on cooling. The acid is insoluble in water, soluble in alcohol, glacial acetic acid, ether and carbon disulphide; it melts at 143°, boils at 360°, and is converted by HCl into a modification melting at 159°–160°.—W. Schkatelow, *Apoth. Ztg.*, 1889, 99.

Hyponitrous oxide or nitrogen monoxide can be obtained perfectly pure by heating 5 parts crystallized stannous chloride, 10 parts hydrochloric acid sp. gr. 1·21, 0·9 parts nitric acid sp. gr. 1·38, until the mixture boils, when a steady evolution takes place according to the reaction:

$$2\,HNO_3+4\,SnCl_2+8\,HCl=4\,SnCl_4+N_2O+5\,H_2O.$$

The above proportions must be strictly adhered to.—G. Campani, *Chem. Rpt.*, 1889, 5.

Cobalt and Nickel.—Krüss and Schmidt in redetermining the atomic weights of these metals by precipitating a neutral solution of auric chloride by means of metallic cobalt and nickel, obtained quite variable results, due to supposed admixture of Co and Ni with the precipitated gold. To control this error the gold precipitate was dissolved and reprecipitated by addition of sulphurous acid; even now the results were still discordant. In washing the gold precipitate the color of the washings disappeared and then became finally greenish;

this portion was collected separately and after evaporation and ignition a white oxide was obtained which, on examination, proved to be that of a new element. From 50 gm. oxide of nickel 1 gm. of this white oxide was obtained. The reactions of this new element are: white oxide soluble in HCl, which solution on warming is green colored, on cooling again becomes colorless; hydrate insoluble in excess of the alkaline hydrates, but dissolved by fused KOH or Na OH; black sulphide in alkaline solution, insoluble in ammonium sulphide; oxide non-reducible by H at high temperatures; chloride is colorless, but traces of HCl gas cause a green color which disappears when dissolved in water; chloride forms with red cobaltous chloride a double salt of green color.—*Ber. d. d. Chem. Ges.*, 1889, 11.

Areca-nut contains three alkaloids, *arecoline* 0·07–0·1 %, *arecaine* 0·1 %, and the third one in such small quantity that it has not been possible to examine it. Arecoline, $C_8H_{13}NO_2$, identical with Bombelon's *arecan*, is an alkaline, colorless, oily liquid, soluble in water, alcohol, ether and chloroform; it is poisonous and probably gives the drug its tænifuge properties. Arecaine $C_7H_{11}NO_2+H_2O$ forms permanent colorless crystals soluble in water, insoluble in absolute alcohol, ether, chloroform, benzol, and appears to be inactive.—E. Jahns, *Ber. d. d. Chem. Ges.*, 1888, 3404.

Amyl alcohol of commerce is always contaminated with *furfurol* and resinous matter, and is unfit for extraction purposes. To purify it, it is heated in a steam-bath with an equal volume of sulphuric acid for eight hours, the color changing to a black-brown; the alcohol is separated, neutralized with chalk and distilled in a current of steam. By repeating this process four or five times an almost pure amyl alcohol is obtained; perfectly pure (free from even traces of furfurol) it can only be obtained by decomposing potassium amyl-sulphate with sulphuric acid after first purifying the commercial salt by solution in alcohol and precipitation by a large excess of ether. Thus prepared amyl alcohol may be boiled for hours with concentrated sulphuric acid without assuming color.—L. Von Udranzky, *Ztschr. f. physiol. Chem.*, xiii, 248.

Test for arsenic.—Flückiger in *Arch. der Pharm.*, 1889, p. 1, critically examines Gutzeit's test and finds that it is decidedly more delicate than Marsh's test. The reaction is best carried out by generating hydrogen from dilute hydrochloric acid and zinc and allowing the gas after the addition of the arsenic solution to act upon filter paper moistened with silver nitrate which is placed over the generator; the yellow coloration formed is due to Ag_3 As 3Ag NO_3; this test will allow of the detection of 0·001 mg. As_2 O_3. Not quite so delicate but a more convenient test is gotten by using mercuric chloride to moisten the filter paper, a yellow stain is also produced, but its nature is not established; 0·002 mg. As_2O_3 will be indicated by this modification which has two important advantages: first, $AgNO_3$ is affected by light, $HgCl_2$ is not affected to any marked degree; second, H_3 Sb does not stain $HgCl_2$ while it does stain Ag NO_3. In alkaline solutions, by use of sodium amalgam, not less than 0·01 mg. As_2O_3 can be detected; metallic aluminum with an alkali did not give good results as it contains either S, As or P, which interfere. Other metals in acid solution were tried but none were found superior to zinc. To test the zinc, 10gm. are acted upon by dilute HCl, the evolved gas should produce no yellow stain with Ag NO_3 or Hg Cl_2 in two hours, the test to be made in a dark place. The manufacturers of zinc are asked to produce a metal absolutely free from As, Sb, S and P.

Acetanilid in Phenacetin to the extent of two per cent. may be proven by boiling 0·5 gm. in 5-8 cc. water, allowing to cool, filtering, adding to the filtrate dilute nitric acid and a little potassium nitrite, boiling, adding several drops nitroso-nitric acid and again boiling; a distinct red color appears in presence of acetanilid.—Schrœder (*Ned. Tydschr. Pharm.*) *Pharm. Ztg.*, 1889, 57.

Assay of narcotic extracts.—The method of L. van Itallie requires the following solutions: Lead acetate, 1:10; dilute sulphuric acid, 5:100; chloroform; ether; 1 normal acid; and as indicators cochineal tincture or an alcoholic solution of azotlinin or lacmoid. For the examination of *aconite*, *belladonna* and *hyoscyamus extracts*, the procedure is to take 5 gm. extract which is rubbed up with ten drops dilute sulphuric acid and sufficient water to make 50 cc., allowed to macerate one or two hours, and 25 cc. of the lead acetate solution added. After the subsidence of the precipitate, 50 cc. are filtered off through a dry filter, 10 cc. dilute sulphuric acid added, 50 cc. filtered into a separating funnel, sufficient ammonia added to give alkaline reaction and the alkaloid extracted by use of three portions of chloroform of 50 cc. each. The mixed chloroform extractions are distilled to dryness, the residue taken up in 5 cc. dilute alcohol and, after adding indicator, titrated with $\frac{1}{100}$ normal acid. The acid added represents the alkaloid in $2\frac{7}{9}$ gm. extract. For *conium extract* the solution is rendered alkaline by use of potassium hydrate (1:2) and for extraction of alkaloid ether is used in place of chloroform; before the distillation of the ether 2 cc. water should be added. 1 cc. $\frac{1}{100}$ normal acid is the equivalent of 2·89 mg. atropine and hyoscyamine, 5·33 mg. aconitine and 1·27 mg. conine; to obtain the per cent. of alkaloid directly from the number of cc. acid used, the following factors are calculated: atropine and hyoscyamine, 0·10404; aconitine, 0·1919; conine, 0·04572.

Control experiments with atropine recovered 98·62 and 99·71 per cent.—(*Ned. Tydschr. Pharm.*) *Apoth. Ztg.*, 1889, 124.

Codeine used considerably in medicine of late is made synthetically by R. Dott by passing methyl chloride through a hydro-alcoholic solution of morphine and sodium hydrate; the alcohol is evaporated, the residue taken up in water and the codeine extracted with chloroform. A. Knoll (*Pharm. Centralh.*, 1889, 39) introduces the methyl group into the formula of morphine by reacting upon the latter body with a salt of methyl-sulphuric acid. The product is dissolved in dilute sulphuric acid, the unchanged morphine precipitated from rather dilute solution by ammonia and from the filtrate the codeine is extracted by ether, benzol or chloroform. The alkaloid so gotten is pure and forms colorless rhombic prisms, melting at 155°, soluble in 17 parts hot and 85 parts cold water. For subcutaneous uses the phosphate is the best salt, being soluble in 4 parts water.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the American Journal of Pharmacy.

Phenolate of Mercury.—On account of the variations observed in the preparation of this salt now in the market, M. Hugo Andres proposes the following method "by which pharmacists will always be able to obtain a definite product." First, prepare a phenolate of potassium by dissolving in alcohol of 90 per cent., 94 parts of crystallized phenol and 56 parts of hydrated potash. Evaporate to a syrupy consistency in the water-bath, and place under a bell-glass with sulphuric acid until desiccation is effected. Then dissolve 100 parts of phenate of potassium in alcohol, filter, and precipitate the filtrate with an alcoholic solution of 112 parts of corrosive sublimate. The proportions are calculated as follows:

$$C^{12}H^{5}KO^{2} + HgCl = (C^{12}H^{5}O^{2})Hg + KCl.$$

We thus obtain an orange precipitate, which should first be washed with alcohol of 60 per cent., and then with absolute alcohol until the filtrate gives no precipitate with sulphuretted hydrogen. The dried product is an amorphous powder of a brick red color with a faint odor of phenol. It is insoluble in water, chloroform, sulphide of carbon, ether and alcohol. With heat it dissolves easily in hydrochloric acid; with potash, the solution gives a precipitate of yellow oxide of mercury. It is also dissolved by nitric acid. The preparation contains 51·68 per cent. of mercury; theoretically it should have 51·81 per cent.—*J. de Ph. et de Ch.*; *Bull. com.*, January, 1889.

CAMPHORATED PHENOLS.—M. Désesquelle pointed out some time since (AMERICAN JOURNAL OF PHARMACY, 1888, p. 510) the liquefying influence of camphor upon naphthol. M. Audoucet has been testing the power of camphor over other phenols, and gives the results as follows: (The quantities of camphor cited represent the amounts strictly necessary to reduce the preparations to the condition of a soft paste); *Resorcin*, 2·50 gm.; camphor, 5 cgm.; *Pyrogallol*, 2·50 gm.; camphor, 10 cgm.; *Thymol*, 5 gm.; camphor, 1 gm.; *Salol*, 5 gm.; camphor, 50 cgm. An increased amount of camphor gives syrupy liquids miscible in all proportions with oils, lard and petrolatum, and which are soluble in alcohol and ether, and insoluble in water. Similar results were obtained with menthol.—*Répert. de Phar.*, January 10, 1889.

PYRODINE.—The proper doses of this antipyretic, said to be useful in pneumonia, scarlatina, typhoid fever, migraine and the neuralgias, are given by the *Bull. méd.* as follows: For children, the quantity to be given daily should be from 10 to 20 cgm.; for adults, 40 to 60 cgm. It should not be given oftener than every 18 or 24 hours. Administered repeatedly at short intervals it gives rise to toxic symptoms. It is said to be a powerful antiseptic as well as an antipyretic. Dr. Lepine proposes to call it phenacethydrazine, as, under its present name, it is likely to be confounded with pyridine.—*Répert. de Phar.*, January 10, 1889.

KAVAÏNE, ALKALOID OF KAVA-KAVA.—M. Lavialle (a pharmacist of Crest, France) writes to the *Union Phar.*, Jan., 1889, that he has separated from kava an alkaloid which he has named kavaïne. He exhausted pulverized kava root with alcohol of 60 per cent., and distilled to the density of a fluid extract. He added distilled water to precipitate the resin, filtered the liquor, and neutralized it with ammonia. He then agitated it with ether, adding sulphuric acid, drop by drop, until he obtained a slightly acid reaction. The liquor, on standing 24 hours, deposited crystals which were washed several times with 95 per cent. alcohol. The sulphate of kavaine is soluble in an equal part of water at 15° [59° F.], sparingly soluble in alcohol, and insoluble in ether. It appears in prismatic crystals which deliquesce slightly on exposure to the air.

COCAINE AND LANOLIN FOR BURNS.—Dr. Wende recommends a preparation made of these substances. It excludes the air and quiets the pain. The cocaine should be pure and the mixture freshly prepared.—*J. de Méd. de Paris.*

IODIDE OF POTASSIUM AND SYRUP OF TOLU.—M. Leprince finds that the yellow tint sometimes obtained in mixtures of these substances is caused by the more or less constant presence of carbonate of potassium in the commercial iodide; the carbonate acts upon the resins contained in the tolu, and also, though less strongly upon cinnamein, one of the ethers present.—*Répert. de Phar.*, Jan. 10, 1889.

THE DIURETIC PRINCIPLE OF STROPHANTHUS.—After having separated strophanthin from the seeds, M. Catillon isolated a non-toxic, nitrogenous principle which, tried first upon rabbits and then upon himself, he found to be the diuretic principle of the plant. To obtain it, the author, first exhausting the seeds with alcohol, treats them with distilled water, afterward adding milk of lime, and filtering. A current of carbonic acid is then passed through the filtered liquid, which combines with the excess of lime. The liquid is then evaporated to a syrup, again filtered, and then evaporated in vacuo. The product is soluble in water and in alcohol at 70°; less soluble in stronger alcohol. The product is a sort of strophantate of lime, which gives a precipitate with hydrochloric acid.—*Soc. de Thérap.*, Dec. 26; *Répert. de Phar.*, Jan. 10, 1889.

MORRHUIC ACID.—M. M. Gautier and Mourgues find in cod-liver oil an acid, relatively abundant, having "the double function of an acid and an alkali." It is found, like the ordinary lecithins, in unstable and complex combinations, *i. e.*, it changes with acids or alkalies, setting free glycerin and phosphoric acid. It separates slowly and continuously from alcoholic or aqueous acidulated extracts of cod-liver oil, even when brought together cold. Morrhuic acid, recently precipitated, is oleaginous and viscous, but may be crystallized in square, flat prisms, or in lanceolate forms. It dissolves in hot water, and precipitates on cooling. It is soluble in alcohol; sparingly so in ether. It reddens litmus, decomposes the carbonates, unites with alkalies, and gives salts which precipitate the acetates of lead and the nitrate of silver, but not the acetate of copper, even with heat. It combines with acids and with bases. On submitting it to distillation with alkalies, and to oxidation, we became assured that it belongs to the pyridine series. Its formula is $C^9H^{13}NO^3$, thus differing from tyrosin only by having 2H more. To separate morrhuic acid, it is only necessary to exhaust the oils methodically with alcohol at 35° C. (95° F.), acidulated with 5 per cent. of hydrochloric acid. The alcoholic liquors are saturated with carbonate of potash and distilled in vacuo at 45° C. (113° F.). The residuum is again acidulated, carried for an instant to 100°C. (212° F.), and again taken up by alcohol at 85° C. (185° F.). Evaporation leaves the thick, viscous oil which constitutes morrhuic acid.—*Comptes rendus; L' Union Phar.*, Dec., 1888.

THE AMERICAN TINCTURA QUILLAJÆ.[1]

By J. Rutherford Hill.

On looking over the "National Formulary of Unofficinal Preparations," issued by the American Pharmaceutical Association, I was struck by the process given for the preparation of tinctura quillajæ, which is as follows:

Quillaja, in fine chips	8 troy ounces.
Alcohol	1 pint.
Water	enough to make 3 pints.

Place the quillaja in a suitable vessel, with *two* (2) *pints* of water, and boil for fifteen minutes, then strain and add enough water through the strainer to make the strained decoction, when cold, measure *two* (2) *pints*. Pour this into a bottle containing the alcohol, let the mixture stand twelve hours, then filter it through paper, and add enough water to the filtrate to make it measure *three* (3) *pints*.

A footnote states that each fluid drachm represents 10 grains of quillaia. This seems to imply that the process is practically perfect and that the drug is completely exhausted.

---

[1] Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in Edinburgh, Thursday, January 30; reprinted from *Phar. Jour. and Trans.*, Feb. 9, p. 626.

In view of the criticism on tinctura quillaiæ, B.P.C., communicated to an Evening Meeting of the Society last year by Mr. Boa, and from my own experience with the drug, it seemed to me that the above formula was objectionable and unscientific, on account of the liability of saponin to split up into sapogenin and glucose under the influence of heat. It also appeared to me that the method of pouring water over the marc on a strainer was somewhat rough and not calculated to ensure complete exhaustion. I have found, moreover, that quillaia can be completely exhausted by maceration and percolation with cold water, and it occurred to me that this might be substituted with advantage for the boiling and straining ordered in the first stage of the American process.

A sufficient quantity of quillaia bark (free from outer brown layer) was reduced to fine chips and mixed. From this two tinctures were made, as follows;—

A.—The quillaia, in fine chips, was packed in a percolator, macerated for twenty hours with one-third of the water, and percolated with the remainder of the water. The percolate was a pale golden yellow liquid. This was mixed with the alcohol, when it became slightly opalescent. After standing twelve hours a flocculent precipitate had settled down, leaving a transparent pale yellow liquid with a few flakes floating through it. This passed rapidly through the filter and was made up to the requisite measure with water.

B.—This tincture was made by the American process. The bark absorbs most of the water and there is apparently not much to boil with. It also froths up during the boiling and the operation must be conducted in a capacious vessel. The strained liquid, unlike the cold percolate of the previous process, was of a brownish-yellow color and very cloudy or opalescent. This cloudiness is due, I think, to incipient decomposition and separation of insoluble sapogenin. The strained liquid was mixed with alcohol, and after standing twelve hours a precipitate had settled out, but the supernatant liquid was not transparent but only translucent. The fine floating precipitate causing this slight opacity appeared to clog the filter, and consequently the filtration of the tincture was extremely slow and tedious. The marc from each tincture was percolated with a further quantity of water and the percolate reserved. For preparing the tinctures and for the practical notes thereon I am indebted to my friend, Mr. C. A. Macpherson.

The tinctures and percolates were examined, with the following results:—

	Extractive per cent.	Sapogenin per cent.	Glucose per cent.	Saponin per cent.
A	4·28	0·74	1·6	2·63
B	4·02	0·67	1·4	2·30
C	0.14	Trace.	Trace.	—
D	0·23	0·06	Distinct trace.	0·20

C and D are the water percolates from the marcs of A and B respectively. These results indicate that the most satisfactory tincture is obtained, and that the drug is most efficiently exhausted by cold maceration and percolation.

A tincture of quillaja is frequently used in Edinburgh for hairwashes, and I find a general impression prevails to the effect that by using heat a stronger and more syrupy tincture is obtained, which froths more readily and is a better emulsifying agent. The foregoing results do not tend to support such an impression. Possibly the small quantity of glucose in the tincture made by heat may give a certain tenacity to the liquid, which tends to preserve the froth longer; but a few experiments made with A and B, both as to frothing and emulsifying, indicate little or no difference, and if there is any difference it is in favor of the cold-made tincture. In any case boiling should be avoided, and if heat is to be used at all, it should only be in the form of infusion.

It will also be seen from the above table that the quillaia is practically exhausted by the cold process, whereas exhaustion is less complete by the comparatively rough method of washing the marc on the strainer, as ordered in the American process.

The decomposition of the saponin does not come out fully in the above table, because, though the change has taken place, the quantity of alcohol is sufficient to keep in solution the sapogenin formed. That such a change has taken place, however, is indicated by means of Fehling's solution. If a little of the American tincture is warmed with Fehling's solution reduction takes place immediately. With the cold-made tincture, under similar circumstances reduction does not take place until it has been boiled for a time.

Another feature in the American formula which seems unnecessary is the intermediate stage of mixing the watery decoction with alcohol, allowing to stand twelve hours and filtering. There does not appear to be any advantage in dissolving out mucilaginous matter with water and then precipitating it with alcohol. It would be an advantage to avoid this stage altogether, and this could be done by simplifying the formula, as follows :—

Quillaja bark, in fine chips	8 troy ounces.
Alcohol	1 pint.
Water	enough to make 3 pints,

Mix the alcohol and water; pack the bark in a percolator; moisten with 1 pint of menstruum; allow to stand twelve hours and then percolate with the remainder, adding water until the percolate measures 3 pints. Filter if necessary.

Mr. Boa, in the paper to which I have referred, showed that such a process is efficient, and that quillaja bark can be completely exhausted by percolation with proof spirit. The American menstruum is deficient in alcohol, as is shown by the tinctures now exhibited, which are beginning to throw down a deposit. Mr. Boa also showed that a menstruum containing less alcohol than the proof spirit of the British Pharmacopœia gave a tincture which deposited on standing. I would therefore suggest that the menstruum in the American formula should be increased in alcoholic strength to 49 per cent. by weight.

With regard to the degree of disintegration of the bark I think the American standard of fine chips is much better than the No. 20 powder of the B.P.C. formula. Quillaia bark is exceedingly difficult to reduce to fine powder, both on account of its toughness and its very irritating effect on the nasal mucous membrane, as all those can testify who have had to deal with it. So fine a state of division is, moreover, quite unnecessary, and never, so far as I have seen, adopted in practice. I would therefore suggest that the formula of the B.P.C. unofficial formulaly should be altered in this respect, and fine chips substituted for No. 20 powder. As an ordinary emulsifying and therapeutic agent it would also, I think, be an advantage to have in the B.P.C. formulary a tincture made with dilute alcohol, in addition to the present tincture made with rectified spirit, which is required only for a special purpose.

Effect of coffee on the Urine.—Dr. Dumont's observations prove that after the use of coffee the amount of urea contained in the urine is increased, and that it decreases again to the previous amount as soon as the coffee is omitted.—*Lancet.*

QUILLAJIC ACID.[1]

By R. KOBERT.

The saponin of commerce, as all other specimens of saponin, is an almost inactive, non-poisonous modification of quillajic acid. The author precipitated the acid from the aqueous extract of the bark of *Quillaja Saponaria* with neutral lead acetate; the precipitate was freed from lead, the solution of the acid evaporated almost to dryness, and then taken up with hot absolute alcohol. The coloring matter was precipitated with chloroform; the quillajic acid eventually crystallized out in pure white flakes. It is insoluble in ether, soluble in water and alcohol. On treatment with concentrated sulphuric acid, it becomes dark red. By boiling with dilute mineral acids, it is split up into an unfermentable glucose and sapogenin; this solution reduces Fehling's solution. Quillajic acid has the formula $C_{19}H_{30}O_{10}$. The sodium salt acts as a very severe caustic on the tongue and throat, and the smallest particles coming in contact with the nose or throat cause violent sneezing and coughing. Brought on to the eye, it causes severe pain, flow of tears, and swelling of the lids. Injected into the blood, sodium salt proves fatal, causing cramp and paralysis of the respiratory organs and brain. On the other hand, it may be imbibed into the stomach without injury to the extent of 500 times the quantity which proves fatal when injected into the blood.

Sick Headache Powder.—A preparation is offered under this name and recommended for sick headache. Its apparent efficiency suggested an investigation into its proximate composition. A few qualitative experiments resulted in reactions showing the presence of milk sugar and sodium salicylate. The moisture amounted to 1 per cent., the ash consisting of Na_2CO_3 weighed 1½ per cent. Each powder is put up in waxed paper containing 30 grains of the cream colored or white powder, which consists of equal parts of milk sugar and sodium salicylate.

A powder similar in appearance was prepared in accordance with these results, and was found to produce the same effect.

ROBERT GLENK.

---

[1] From *Jour. Chem. Soc.*, 1889, p. 55; *Arch. exp. Path. Phar.*, xxiii. 233.

CULTIVATION OF SESAMUM AND GROUND-NUTS IN CHINA.

Sesamum is best grown on high dry ground, and is most in danger from excess of moisture; it does not require watering, and dew alone is sufficient moisture to nourish it. In making beds, therefore, the centres should be higher than the sides, so as to allow the water to run off. In the first month of every year it is sown broadcast, not in lines, and whether thickly or sparsely is immaterial. In about ten days it puts forth shoots, in two months and a half it is fit for harvesting. At harvest time the latest seeds are not yet ripe, but the harvest cannot wait, or the other pods would fall off, and the seeds drop out on the ground. The plants, root and all, are carefully taken out of the ground, put on a cement floor, and threshed with a flail. There are two kinds, black and white. Sesamum does not require manure generally, but in the worst soil ashes and ox manure may be used. About 27 ounces sown to an acre yield about 550 lbs.

Ground-nuts are best grown in a soil of coarse sand and mud. They should be set deep, and the ground pressed down firmly over them. The ground is ploughed about April, and trenches dug about 10 inches apart, into which ashes, lime, and rubbish are thrown. The seeds are sown 10 inches apart, and as each is put in the sides of the trench are turned over it with the foot and stamped down firm. Every ten days or so the ground is weeded, and in about two months the sprouts are sufficiently long, and are sprinkled with liquid manure. In four months they come into flower; the flower-stalk then bends over, and, as the flower falls off, the flower-stalk buries itself in the ground, and produces seeds, ground-nuts, which become ripe about the Shuangchiang festival (October 23). When the harvest, however, takes place after this date more oil can be got, and a better price obtained for it. Ground-nuts are harvested by ploughing them up with an ox-plough, when the stalks and seeds clinging to the plough are gathered into a heap. For the remainder which are still left in the ground two men sift the earth with a large bamboo sieve. The pods are dried perfectly dry in the sun, until the thin skin which covers the seed can be broken by rubbing, when they can be stored. If they are not quite dry they shoot again, and are useless. Oil is pressed from ground-nuts, and the refuse made into ground-nut cakes; 40 lbs. sown to an acre yield about 666 lbs.—*Phar. Jour. and Trans.*, Dec. 22, 1888, p. 492.

ASPIDIUM FILIX MAS, L.[1]

By G. Daccomo.

If the ether extract residue of the rootstock of aspidium (male fern) is treated with two volumes of 95 per cent. alcohol and one volume of ether, a brown residue is left which is partially soluble in one per cent. aqueous potash. The soluble portion is the filicin or filicic acid of Trommsdorff; the insoluble part separates from an alcoholic solution as a white, floccular, waxy substance, $(C_{13}H_{26}O)_n$, melting at 80°, it is insoluble in water, sparingly soluble in ether and cold alcohol, but soluble in hot alcohol; it is not decomposed by boiling alcoholic potash, and gives no coloration with sulphuric acid and chloroform.

The residue obtained by evaporating the alcohol-ether solution of the original extract, when extracted with water, furnishes glucose and tannin, and with 95 per cent. alcohol a black resin which is almost completely soluble in 2 per cent. aqueous potash. The residue of the extract, insoluble both in water and alcohol, is a green oil difficult to saponify.

The blood-red alkaline solution when agitated with ether parts with some of the red coloring matter (filix red). The residue of this ether extract when distilled with steam furnishes the essential oil of filix; this essential oil appears not to pre-exist in the plant. The residue from this distillation, when extracted with ether, gives, when the ether is evaporated, a red liquid and a precipitate, which, after crystallizing from hot alcohol, forms plates melting at 136·5°, having the composition $C_{20}H_{34}O$. This compound has received the name of *aspidol.* It is insoluble in alkalis, easily soluble in ether, benzene, chloroform, light petroleum, and hot alcohol. It is optically active in a 3 per cent. chloroform solution $[\alpha]_D = -24.08$. The filtrate from this precipitate of aspidol was fractionated into three parts. The first fraction, 130—190°, was a yellow oil with a strong odor and acid reaction, which did not reduce silver nitrate. The second fraction, 220—290°, was a beautiful green oil, which gradually became brown; it has the empirical formula $(C_{27}H_{46}O_2)_n$. The third fraction above 300° (at 200 mm. pressure) corresponds with the formula $(C_{34}H_{58}O_2)_n$.

---

[1] Reprinted from Journal of the Chemical Society, 1888, p. 521, and 1889, p. 54. The first part of the paper appeared originally in *Annali di Chimica e Farmacologia*, 1887, p. 69; and the second part relating to the chemistry of filicic acid in *Berichte d. D. Chem. Ges.*, 1888, p. 2962. Compare also the preliminary report in American Journal of Pharmacy, 1886, p. 378.

By precipitating the alkaline solution extracted with ether with sulphuric acid, two resins were obtained: 1st, a brick-red solid melting at 85—93°; 2nd, a more abundant and almost black, plastic mass. The filtrate contains butyric acid.

Filicic acid, prepared by the method already described, has the composition $C_{14}H_{16}O_5$. It is a yellowish, odorless, crystalline powder, melts at 179—180° (uncorr.), and is insoluble in water, almost insoluble in absolute alcohol, moderately soluble in glacial acetic acid, ether, amyl alcohol, and toluene, and readily in chloroform, carbon bisulphide, and benzene. The *benzoyl*-derivative, $C_{21}H_{20}O_6$, separates from dilute alcohol in colorless crystals, melts at 123°, and is very readily soluble in ether, but insoluble in water. The *ethyl* salt, $C_{16}H_{20}O_5$, prepared by treating the acid with alcoholic potash and ethyl iodide, separates from dilute alcohol in reddish crystals, melts at 142°, and is very readily soluble in ether and benzene, but insoluble in water. The *propyl* salt melting at 158°, and the *ethylene* salt melting at 165°, resemble the ethyl salt in appearance and insolubility.

Bromofilicic acid, $C_{14}H_{15}BrO_5$, prepared by treating the acid with bromine in glacial acetic acid solution, chrystallizes from alcohol in red prisms, melts at 122°, and is very readily soluble in absolute alcohol and ether, but insoluble in water.

Anilidofilicic acid, $C_{14}H_{15}O_4NHPh$, obtained by boiling a glacial acetic acid solution of the acid with aniline, separates from alcohol in reddish-violet crystals, melts at 140°, and is soluble in alcohol and benzene, but insoluble in water.

The *hydrazide*, $C_{14}H_{16}O\cdot(N_2HPh)_4$, prepared by boiling an ethereal solution of the acid with phenylhydrazine, crystallizes from ether in red needles, melts at 198°, and is readily soluble in alcohol, but insoluble in water. When the acid (100 parts) is heated above its melting point (compare Luck, *Annalen*, liv. 119), or heated with water at 170—190°, it is decomposed into isobutyric acid (32·5 parts) and a compound, the composition of which is $C_{20}H_{18}O_7$. Hydrochloric acid produces the same decomposition at 150—160°.

Filicic acid is completely oxidized when treated with chromic acid in glacial acetic acid solution, but when a solution of the potassium salt is oxidized in the cold with a two per cent. solution of potassium permanganate, isobutyric acid and oxalic acid are obtained. The same products are formed when nitric acid of sp. gr. 1·48 is employed. When the acid is treated with zinc-dust in alkaline solution, it is converted into an acid, the composition of which is probably $C_{14}H_{22}O_{11}$, and at the same time a small quantity of isobutyric acid is formed. When treated with sodium in amyl alcohol solution, it yields butyric acid and resinous products.

The compound $C_{20}H_{18}O_7$, referred to above, separates from ether or amyl alcohol as an amorphous, red powder, and has no well-defined melting point. It is soluble in most ordinary solvents, has an acid reaction, decomposes carbonates, and dissolves in alkalis, forming red solutions, from which it is precipitated in red flocks on adding acids. It yields phthalic acid and small quantities of oxalic acid when oxidized with nitric acid of sp. gr. 1·40 in the cold. When reduced with zinc-dust in alkaline solution, it gives a colorless substance which rapidly oxidizes, and is probably reconverted into the original compound.

From the above results, it follows that filicic acid is probably an isobutyric acid derivative of hydroxynaphthaquinone.

RECENT PROCESSES FOR TESTING QUININE.[1]

By W. Lenz.

The foreign alkaloids in commercial quinine consist chiefly of cinchonidine and hydro-bases. Four principal methods are in use for the determination of these. In all these methods a product ("Nebenalkaloïde") is obtained, containing the greater part of the impurities together with a certain quantity of quinine. In this product, the cinchonidine is determined by the "tetrasulphate process." One gram of the mixture is dissolved in 9 grams of absolute alcohol and 3 grams of 50 per cent. sulphuric acid. The mixture is kept at 0° for 24 hours, the acid liquid is removed by suction, the crystals are washed with a little absolute alcohol, and then air-dried. They are then dissolved in water, and the base is precipitated by excess of sodium carbonate. It is dried first over sulphuric acid, and then at 115°. A correction (the amount of which depends on the per centage of cinchonidine found) must be applied. The author gives a curve for the purpose. The cinchonidine is very nearly pure. The hydro-bases are determined approximately by oxidizing the quinine and cinchonidine in acid solution by a 1 per cent. solution of potassium permanganate, rendering alkaline, and shaking with ether, followed by chloroform. The residues from these solutions, although very impure, are regarded as hydroquinine.

---

[1] *Zeit. anal Chem.*, xxvii., 549—631; reprinted from *Jour. Chem. Soc.*, 1889, p. 86. See also paper on the same subject by Dr. O. Hesse, in Am. Jour. Phar., 1887, p. 404.

The "chromate process" was recommended by Dr. De Vrij (see Amer. Jour. Phar., 1887, p. 343), and the "oxalate test" by Dr. L.Schaefer (see Amer. Jour. Phar., 1887, p. 153). The amount of oxalate prescribed is insufficient for samples containing less than 15 per cent. of water, and the cooling at 20° should be prolonged to one hour. Schaefer's correction of 0·04 gram per 100 cc. appears to be too large.

In Hesse's "bisulphate process" 5 grams of quinine sulphate is dissolved in 12 cc. of normal sulphuric acid by warming, and the solution is allowed to crystallize in a narrow-necked funnel in a cold place. The mother-liquor is withdrawn by a filter-pump into a graduated cylinder, and the crystals washed with three cc. of water. This solution is shaken with 16 cc. of ether (0·721—0·728), then 3 cc. of ammonia (0·96) added, again shaken, and left for 24 hours. The ether is removed by a pipette, the crystals are collected on a filter, washed with water saturated with ether, dried between filter-paper, washed again with ether, and dried.

In the "crystallization process" of Paul and Hesse, 5 grams of quinine sulphate is dissolved in boiling water, and crystallized out four times, using in the first case 150 cc., next 130 cc., and then twice 120 cc. The united mother-liquors are evaporated at a low temperature almost to dryness, the residue dissolved in the smallest possible quantity of dilute sulphuric acid, made up to 20 cc., and shaken with ether and excess of ammonia. The crystals which form are treated as in the bisulphate test. The hydro-bases crystallize in part with the quinine, therefore the mother-liquor should not be used for their determination.

The chromate process gives very varying results, but on the average gives the highest yield of cinchonidine, especially with the purer samples. The oxalate test gives the lowest numbers, but they are more concordant than those of the chromate process. The composition of the bye-product is, however, variable. The bisulphate test gives results varying considerably. The alkaloids in the ethereal solution ought to be submitted to the process a second and even a third time, but even with this improvement the whole of the cinchonidine is not obtained, and the results vary much, but the composition of the bye-product is more uniform than in the other processes. The crystallization test has the same advantages as the bisulphate test if the crystallization is repeated often enough, and is the process which is least influenced by the presence of hydro-bases. It is, however, tedious. The process of the German Pharmacopœia depends on the fact that the precipitate produced by ammonia in solutions of the alkaloids is soluble in excess of ammonia, but that much less ammonia is required for quinine than for the other alkaloids. The excess of ammonia required varies, however, very considerably with the temperature.

THE METAMERIC AMYL NITRITES.

By Professor Dunstan and W. Lloyd Williams.

The liquid which has hitherto been known to scientific chemists as pure amyl nitrite is a mixture of the metameric nitrites, corresponding to α-amyl alcohol or iso-butyl carbinol ($CH(CH_3)_2CH_2CH_2NO_2$) and β-amyl alcohol or secondary butyl carbinol ($CH(C_2H_5)CH_3CH_2NO_2$). The relative proportions of these two nitrites in the mixture are dependent on the composition of the "amyl alcohol" from which they have been prepared. The respective quantities of these two metameric alcohols contained in different specimens of fusel oil are subject to variation. The quantity of the α-amyl alcohol, which is optically inactive, is always much larger than that of β-amyl alcohol, which is lævorotatory. In the portion of fusel oil which has been repeatedly fractionated between 127°–132°, there is said to be usually about 13 per cent. of the active alcohol. These alcohols cannot be separated by fractional distillation, since the α-amyl alcohol boils at 128° C. and the β-amyl alcohol at 131° C. Their separation is a matter of very great difficulty, and it has seldom been accomplished.

Our first experiments related to the properties of the mixture of these two nitrites. The statements of different observers about its properties are inconsistent, the boiling point being variously stated at almost every temperature between 90° and 99° C. These discrepancies are no doubt in part due to the employment for the preparation of the nitrites, of more or less perfectly rectified fusel oil. The fraction boiling between 127°–132° C., is known in commerce as "amyl alcohol," and unless the operation of fractional distillation has been many times repeated, the liquid is liable to contain more or less iso-butyl alcohol (b. p. 108·4°). On account of the difficulty of completely removing iso-butyl alcohol, as well as substances of higher boiling-point, from fusel oil by distillation, we decided to make our first experiments with amyl alcohol which had been otherwise purified. Advantage was taken of the superior solubility of the barium salt of iso-butyl sulphuric acid.

About 300 grams of the fraction of fusel oil which had been repeatedly distilled between 127°–130° C. were warmed for some days with an equal quantity of sulphuric acid. The liquid was then poured into 5 litres of water. The dark oily layer which separated was removed, and the clear liquid neutralized with barium carbonate. This solution of the barium salts of iso-butyl sulphuric acid and the two amyl-sulphuric acids was evaporated to about one-third of its original volume. The salts deposited on cooling the liquid were many times recrystallized from water. By this means the more soluble barium iso-butyl sulphate was removed, together no doubt with some of the barium β-amyl sulphate, which is rather more soluble than barium α-amyl sulphate. From the mixed barium salts the alcohols were regenerated by conversion into the sodium salts, which were distilled with diluted sulphuric acid. The resulting alcohols were dried by digestion with ignited potassium carbonate and distilled. Nearly the whole of the liquid came over at 129° C. The specific gravity was ·813 at 15° C. (water at 15°=1). The rotatory power at 15° C. determined with Laurent's instrument in a column 200 mm. long was —1·35°. The maximum rotation observed by Ley in a specimen of β-amyl alcohol was —8·8° for a column 200 mm. long, so that the specimen above described contained 84·66 per cent. of α-amyl alcohol and 15·34 per cent. of β-amyl alcohol. The alcohols were now converted into the nitrites by reaction with sulphuric acid and sodium nitrite. The respective quantities of the materials used were calculated from the equation

$$2C_5H_{11}OH + H_2SO_4 + NaNO_2 = 2C_5H_{11}NO_2 + Na_2SO_4 + 2H_2O.$$

The method was very successful, and the nitrites thus easily prepared were washed with a solution of potassium carbonate and dried by digestion with the ignited salt. The liquid entirely distilled between

96°–97° C. and was *dextrorotatory.* The lævorotatory β-amyl alcohol had given rise to a dextrorotatory nitrite. Le Bel (*Bull Soc.* [2], xxv., 545) has shown that the amyl chloride, bromide and iodide prepared from the lævorotatory alcohol are also dextrorotatory.

The physiological action of the mixture of α-amyl and β-amyl nitrites thus prepared has been investigated by Professor Cash, who finds that it produces in animals a rapid fall of blood pressure, an acceleration of the pulse-rate, and a slowing of the respiratory movements, although it does not appear to act so powerfully in these respects as iso-butyl nitrite.

In order to separate these two metameric nitrites, it was necessary first to obtain the corresponding alcohols. The separation of the two alcohols was first effected by Pasteur (*Compt. Rend.*, xli., 296), by converting them into two barium amyl-sulphates, and repeatedly recrystallizing these salts from water, by which means it is possible to obtain the pure salt corresponding to the inactive alcohol, and after several further series of recrystallizations of the residual salts, that corresponding to the active alcohol; the barium salt of β-amyl-sulphuric acid being about two and a half times more soluble than the barium salt of α-amyl-sulphuric acid. This process of isolation is very laborious, and has not often been repeated; in fact, it is doubtful whether the active alcohol has yet been obtained pure, since specimens prepared by different observers have not exhibited the same rotatory power. Le Bel has proposed to separate the two alcohols by the prolonged action of gaseous hydrochloric acid, when the inactive alcohol is more readily attacked and converted into the chloride, than the active alcohol. It seems however from the experience of other observers that this method is hardly less tedious than Pasteur's, and as the latter method had already been successfully employed by Pedler, we decided to attempt to effect the separation by its means.

Fusel oil, which had been distilled with steam, was dried and fractionated. The fraction obtained between 127°–132°, after having been several times redistilled, exercised a rotation of –1° (for the D ray), in a tube 200 mm. long, at 15° C., the determination being made in Laurent's instrument. If we take —8·8° (Ley) as the rotatory power of the active alcohol under the same conditions, then this liquid was constituted of 88·64 per cent. of α-amyl alcohol and 11·36 per cent. of β-amyl alcohol. Aboul $1\frac{1}{2}$ litre was warmed for one week with an equal weight of sulphuric acid, the mixture was largely diluted with water, neutralized with barium carbonate, and filtered. The solution was concentrated and fractionally crystallized, the fractions, which were early obtained, were isolated and separately recrystallized about twenty-three times. From some of the salt thus purified the alcohol was regenerated, dried and distilled. It boiled at 129°–130° C., and at 15° C. its specific gravity was ·813. The liquid was found still to possess rotatory power. At 15° C. in a tube 200 mm. long the rotation was observed to be –0·45°, so that the repeated recrystallization of the barium salts had only removed two-thirds of the active alcohol which the liquid originally contained. The regenerated liquid still contained 5·1 per cent. of the active alcohol. Since a comparison of the physiological effects of several specimens of a-amyl nitrite, associated with different amounts of β-amyl nitrite, with the physiological effect of pure a-amyl nitrite, would enable the action of β-amyl nitrite to be inferred, the above-mentioned alcohols were converted into the nitrites, and their action is being physiologically examined by Professor Cash. The nitrites boiled at 96°–97°, and the specific gravity of the liquid was 0·874 at 15° (water at 15°=1).

The remainder of the barium salts was now dissolved in a large quantity of water, and the dilute solution allowed to crystallize slowly. The salt obtained was separated from the mother-liquid and again recrystallized twelve times. The barium salt had now been recrystallized thirty-five times. On regenerating the alcohol and drying it, the boiling point was found to be 131° C. (bar. 759 mm.), the whole of the thermometric column being immersed in the vapor. The specific gravity of the liquid at 15° C. was 0·8140 (water at 15°=1). The alcohol was now practically inactive, the rotation effected in a column 200 mm. long being only one-tenth of a degree.[1] The nitrite was now prepared from this alcohol by the method which has been previously described, and its characters have been carefully examined. It was shown to be pure by the method which has already been alluded to. (Weight of liquid taken 0·1787 gram; pure amyl nitrite found 0·1797 gram.). The boiling point determined with a standard thermometer is 97° C. (bar. 758·5 mm). Its specific gravity at 15° is 0·880 (water at 15°=1). The liquid was virtually inactive, showing a dextrorotation in a tube 200 mm. long of only one-twentieth of a degree.

---

[1] A specimen prepared by Pedler and recently examined by Dr. Perkin (*Journ. Chem. Soc.*, 1884, 470), exhibited a rotation of –0·9° in a column 200 mm. long. The specific gravity at 15° was 0·8135, and the boiling point 131·5° C.

a-amyl nitrite is a pale yellow liquid having a not disagreeable odor, and producing when inhaled the characteristic nitrite-effect. Its physiological action is being investigated by Professor Cash.—*Phar. Jour. and Trans.*, Dec. 22, 1888, p. 487.

SOLUBILITY AND ESTIMATION OF PARAFFIN.[1]

By B. Pawlewski and J. Filemonowicz.

The following table gives the solubility at 20° of ozokerit paraffin of sp. gr. 0·9170 at 20°, melting at 64–65°, and solidifying at 61–63°:

Solvent.	Paraffin (grams,) disolved by		Weight of solvent required to dissolve completely 1 part of paraffin.
	100 grams.	100 cc.	
Carbon bisulphide	12·99	—	7·6
Light petroleum up to 75° C., sp. gr. 0·7233	11·73	8·48	8·5
Turpentine oil, sp. gr. 0·857; b. p. 158—166°	6·06	5·21	16·1
Cumene (comm.), up to 160°, sp. gr. = 0·867	4·28	3·72	23·4
Cumene (frac.), 150—160°, sp. gr. = 0·847	3·99	3·39	25·0
Xylene (comm.), 135—143°, sp. gr. = 0·866	3·95	3·43	25·1
Xylene (frac.) 136—138°, sp. gr. = 0·864	4 39	3 77	22·7
Toluene (comm.), 108—110°, sp. gr. = 0·866	3·83	3·34	26·1
Toluene (frac), 108·5—109·5°, sp. gr. = 0·866	3·92	3·41	25·5
Chloroform	2·42	3 61	41·3
Benzene	1·99	1·75	50·3
Ethyl ether	1·95	—	50·8
Isobutyl alcohol (comm.) sp. gr. = 0·804.	0 285	0·228	352·0
Acetone, 55·5—56·5°, sp. gr. = 0·797	0·262	0·209	378·7
Ethyl acetate	0.238	—	419·0
Ethyl alcohol, 99·5° Tr	0·219	—	453·6
Amyl alcohol, 127—129°, sp. gr. = 0·813	0·202	0·164	495·3
Propionic acid	0·165	—	595·3
Propyl alcohol	0·141	—	709·4
Methyl alcohol, 65·5—66·5°, sp. gr. = 0·798	0·071	0·056	1447.5
Methyl formate	0·060	—	1648.7
Glacial acetic acid	0·060	0·063	1668·6
Ethyl alcohol, 94·5° Tr	0·046	—	2149·5
Acetic anhydride	0·025	—	3856·2
Formic acid (cryst)	0·013	0·015	7689·2
Ethyl alcohol, 75° Tr	0 0003	—	330000·0

---

[1] *Berichte d. D. Ch. Ges.*, xxi., p. 2973; reprinted from *Jour. Chem. Soc.*, 1889, p. 82.

The liquid constituents present in many products of the petroleum or ozokerit industry are soluble in glacial acetic acid, whereas vaselin, cerisin, ozokerit, and paraffin are almost insoluble. To estimate the quantity of solid paraffin in petroleum, lubricating oils, mineral oils, vaselin, etc., 5—20 cc. of the mixture is well shaken with 100—200 cc. of glacial acetic acid, the residual paraffin thrown on to a weighed filter, washed two or three times with glacial acetic acid, and then two or three times with alcohol of 75°. Tr., dried and weighed, or the residual paraffin is washed, dissolved in benzene or ether, the solution evaporated, and the residue weighed. This method is quick and accurate, and can be carried out at the ordinary temperature.

THE CHEMICAL CONSTITUENTS OF AMYL NITRITE USED IN MEDICINE.

By Professor Dunstan and E. J. Woolley.

The "amyl nitrite" of the British Pharmacopœia is prepared by the action of "nitric or nitrous acid" on amyl alcohol which has been distilled between 128°–132° C. The constituents of the nitrite thus obtained must be subject to considerable variation, being dependent not only on the use of "nitric or nitrous acid," but also on the composition of the crude amyl alcohol, as well as on the extent to which the operation of fractionally distilling the alcohol has been carried. From a consideration of the constituents of fusel oil or crude amyl alcohol it seemed likely that the official nitrite might contain iso-butyl nitrite, *α*-amyl nitrite, *β*-amyl nitrite, and perhaps primary propyl nitrite, although neither the nitrite of propyl nor the nitrite of iso-butyl appears to have been mentioned by previous workers on the subject as a possible constituent of the liquid. It is known that the substance contains unaltered amyl alcohol, besides oxidation products, such as valeric aldehyde and valeric acid, amyl valerate, etc., these compounds being noticed to occur to the largest extent when nitric acid is employed in the preparation of the nitrite. The employment of nitric acid has also been stated to give rise to the formation of some amyl nitrate, and the production of hydrocyanic acid has been observed. To these non-nitrite constituents, as they may be termed, we have not paid any special attention in the course of the present inquiry, since there is no evidence that the therapeutic value of the liquid is dependent on their presence.

Two specimens of the official "amyl nitrite" have been examined; both of them were obtained of well-known manufacturers. In order to separate a sufficient quantity of the constituent nitrites for identification, recourse was had to several series of fractional distillations.

The first specimen examined had been obtained from a maker of great repute. Half a litre was distilled from a flask fitted with a long tube carrying a T-piece, the thermometric column being entirely immersed in the vapor.

The liquid commenced to distil at 77° C., and the following nine fractions were collected. A dark-colored residue containing amyl alcohol and other substances remained in the flask.

I. 77°– 82° .... = 30 cc.
II. 82°– 88° .... = 23 cc.
III. 88°– 93° .... = 140 cc.
IV. 93°–100° .... = 138 cc.
V. 100°–105° .... = 52 cc.
VI. 105°–110° .... = 24 cc.
VII. 110°–120° .... = 17 cc.
VIII. 120°–125° .... = 12 cc.
IX. 125°–132° .... = 20 cc.

This process of fractional distillation was repeated five times with each of these nine portions. A considerable quantity of liquid was thus obtained between 67°–69°, and again between 94°–98°. These liquids were again distilled and the fractions collected at 67°, and 96° respectively. The specific gravity of the liquid boiling at 67° was ascertained to be 0·8755 at 15° (water at 15°=1). The nitrite was estimated in the compound, and it was found to correspond almost exactly with that contained in iso-butyl nitrite (0.1756 gram. of liquid yielded an amount of nitric oxide corresponding to ·1746 gram. $C_4H_9NO_2$). The physical and chemical properties of the liquid were thus shown to be identical with those of pure iso-butyl nitrite. This compound constituted about 10 per cent. of the original "amyl nitrite." The liquid which boiled nearly constantly at 96° was next examined. Its specific gravity was 0·878 at 15° (water at 15°=1). The amount of nitrite contained in it was almost the same as that contained in amyl nitrite (0·211 gram yielded an amount of nitric oxide corresponding to 0·2099 gram of $C_5H_{11}NO_2$). This liquid was evidently a mixture of *α*-amyl nitrite (b. p. 97°) and *β*-amyl nitrite (b. p. 94° circa). The presence of the *β*-amyl nitrite was proved by the dextro-rotation exercised by the liquid. The quantity of the amyl nitrites contained in the original substance was about 50 per cent.

A specimen obtained from another well-known maker had evidently been prepared from very imperfectly rectified fusel oil, and in all probability by the action of nitric acid. When half a litre was fractionally distilled a liquid was obtained at 20° which after redistillation proved to be chiefly ethyl nitrite (b. p. 17°). Liquid distilled at all temperatures between 20°–55° and at 55°, 65 cc. had been obtained. This fraction, when submitted to redistillation, yielded primary propyl nitrite. Between 55°–70° 53 cc. of liquid passed over, and after this had been many times fractionally redistilled iso-butyl nitrite (b. p. 67°) was obtained. Between 70°–80° 60 cc. distilled and between 80°–90° 35 cc. By distilling these fractions, together with residues from the distillation of lower fractions, a mixture of *a*-amyl nitrite and *b*-amyl nitrite boiling at 96° was isolated. It was shown by analysis to be almost pure (0·211 gram. of liquid yielded an amount of nitric oxide equivalent to 0·2109 gram. of $C_5H_{11}NO_2$). By continuing the fractional distillation about 50 per cent. of liquid was collected above 100°. In this liquid were recognized unaltered amyl and other homologous alcohols, valeric acid and amyl valerate, but it was not minutely examined. The total amount of the amyl nitrites obtained constituted less than 40 per cent. of the original liquid.

Professor Cash has observed that pure iso-butyl nitrite acts more powerfully than the mixture which constitutes the official "amyl nitrite."

We wish to thank Miss L. E. Boole and Mr. Frank Browne for having confirmed, by an independent series of experiments, the results which are recorded in this paper.—*Phar. Jour. and Trans.*, Dec. 22, 1888, p. 489.

PHOTOGRAPHY.

By F. V. Butterfield.

(*Continued from page* 103.)

The first thing required in the silver salt process is some ready-sensitized albumenized paper; this can now be bought very cheaply, and consists of paper coated on one side with egg-albumen, containing also in its solution a certain amount of ammonium chloride. When dry it is sensitized by floating it on a bath of silver nitrate (made also of a particular strength), the chloride and silver nitrate of course at once reacting, the change being expressed by the equation—$NH_4Cl + AgNO_3 = AgCl + NH_4NO_3$.

But at the same time the albumen is also coagulated, forming an insoluble compound, said to be silver albuminate, and thus the silver chloride simultaneously formed is prevented from sinking into or being absorbed by the texture of the paper.

Placing the negative in a printing frame, constructed for the purpose, with the film side up, lay on it a piece of the sensitized paper, cut to the proper shape and size with the albumenized surface down, and having super-imposed a few pieces of blotting paper, to ensure close contact between the printing paper and the negative; fasten on the back. Next expose it to a good even light, examining the print by means of the hinged back of the frame, from time to time. It will be found necessary to print a little deeper than the required result, the subsequent processes of "toning" and "fixing" always tend to make the finished photograph a little lighter in color.

The chemistry of silver printing is still obscure. We have, as just shown, a sheet of paper made sensitive to light, by coating it with a mixture of silver chloride and silver albuminate; ammonium nitrate, a trace of free silver nitrate and a little citric acid usually added as a preservative being also present. On exposure to the light as beneath the negative, it is darkened in color, caused of course by the action of the light on the silver chloride and albuminate, the former being reduced to the theoretical subchloride, Ag_2Cl, and the latter, as an organic salt of silver, to a sort of sub-oxide. But our actual knowledge of what really takes place is very slight, and little progress in the matter has been made since the days of Scheele.

Having then obtained several prints from the negative, they must next be washed in two or three changes of water, allowing a few minutes for each immersion, and the last wash-water should be only slightly milky. They are then ready for the process of "toning," which really consists in gilding the silver image, thereby making the finished photograph much more pleasing in appearance and greatly increasing its durability and permanency.

Of the numerous toning solutions, I recommend the "acetate," which is made as follows:—

℞. Auri chlorid.	grs. viiss.
Sodii acetat.	ʒiv.
Aq. dest.	ad Oij.

This solution, like good wine, improves with keeping, and is better prepared at least two days before required for use. Its action on the washed prints would appear to be, according to Captain Abney, expressed by the equation:—$2\,AuCl_3+NaC_2H_3O_2=Au_2+NaC_2Cl_3O_2+3HCl$.

The washed prints are then put into it, one by one, face downwards, and kept in constant motion to prevent overlapping and consequent uneven toning. When their foxy red color has gradually turned to a purple tint the operation is complete, and they are at once taken out and immersed in a weak solution of sodium chloride, which immediately arrests any further action of the toning bath, then finally transferred to the "fixing" bath, which, as before, consists of a solution of hypo, 4 ounces to the pint, and after having been allowed to remain in it for about ten minutes they must be taken out and thoroughly washed, because the least trace of "hypo" left in the prints will cause them, sooner or later, to fade. For convenience in washing I have found the "Godstone" rocking tray answer admirably, and it is also one of the cheapest in the market.

The addition of a little sol. hydrogen peroxide has been recommended for the elimination of the last traces of "hypo," which it oxidizes into innocuous acid sulphate, thus:—$Na_2S_2O_3+4\ H_2O_2=2NaHSO_4+3\ H_2O$.

The last wash-water may also be tested by the "iodide of starch" reaction for traces of "hypo."

The end of the various chemical processes has now been reached; it only remains to trim the prints to the exact size required, by means of the cutting shapes sold for the purpose, and mount them on the usual pieces of pasteboard. For this purpose I find nothing succeeds like starch paste made *sec. artem.*

A burnisher supplies the finishing touch, greatly improving their appearance by imparting a glossy surface, but this, of course, is by no means necessary.

The intending beginner will find his greatest difficulty at the commencement to be *correct* exposure. For his under-exposed plates there is no remedy, but those a little "over" may be sometimes turned to good account by resorting to intensification. This is effected by placing the negative in a saturated aqueous solution of mercuric chloride, until the requisite amount of density is obtained. The action of the intensifier being:—

$$\underset{\substack{\text{Silver forming}\\ \text{the image.}}}{Ag+HgCl_2} \quad = \quad \underset{\substack{\text{Double chloride of mercury}\\ \text{and silver.}}}{AgCl{\cdot}HgCl.}$$

The plate is then well washed under the tap, and put into a dilute solution of NH_4HO, when the bleached appearance of the film is instantly turned to a jet black, caused by the action of the ammonia on the mercurous chloride, which it converts into mercurous ammonium chloride, the silver chloride being for the most part dissolved away,

$$2HgCl+2NH_4OH=NH_2Hg_2Cl+NH_4Cl+2H_2O,$$

and

$$AgCl+2NH_4OH=AgNH_4NH_2Cl+2H_2O.$$

In contradistinction to the above, we have, also, what is termed "thinning" or "reducing" the negative.

This is requisite when, during the necessarily prolonged development of a slightly *under*-exposed plate, with the aim of bringing out some more detail in the shadows, the high lights have become too dense for printing. A method recommended by H. P. Robinson answers fairly well. It consists in first wetting the refractory negative in water to swell the gelatine, then soaking it in a weak solution of calx. chlorinata, until the requisite amount of reduction has taken place.

It is also a good practice to varnish the negative before taking any prints from it, as, unless the film and the printing paper are both in a perfectly dry state, some free silver nitrate from the latter is liable to cause stains on the negative. A suitable varnish may be made from seed-lac and methylated spirit, about 3 ounces of the former to a pint of the latter. Before using, the back of the negative is gently warmed over a spirit lamp or before the fire, and a pool of varnish poured on the film, allowed to run over the entire surface, and then drained off at the opposite corner.

The alkaline "pyro" developer always stains the film more or less, thus retarding the subsequent process of printing; it is usual, therefore, to put the plate directly after development and just before fixing into what is called the "clearing" solution. This consists of a solution of citric acid and alum, about an ounce of each to a pint of water, care being taken afterwards to rinse the plate well in clean water before immersing it in the bath of "hypo," as the acid it contains is liable to decompose the sodium thiosulphate, liberating hyposulphurous acid, which at once splits up into sulphurous acid and free sulphur, which is deposited in the film.

$$2H_2S_2O_3=2H_2SO_3+S_2.$$

The solution of "hypo" used for "fixing" plates or prints may be used over and over again for subsequent batches, but it must not on any account, through too frequent use, be allowed to get too *weak*, because sodium thiosulphate forms *two* double salts with silver chloride, one being soluble, the other *in*soluble, and with a weak solution there is great danger of the latter being formed:—$AgCl+Na_2S_2O_3=AgNaS_2O_3+NaCl$.

(*To be concluded*).

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, February 19th, 1889.

On motion of Dr. C. B. Lowe, Wm. B. Webb, Ph. M., was called to preside. The minutes of the last meeting were read and no alterations being required they stand approved.

The Registrar reported that there had been presented to the library the following works: Proceedings of the American Pharmaceutical Association for 1888; Notes of Professor Curtman's Lectures reported by Professor H. M. Whelpley, two volumes; Pharmacopœia of the London Throat Hospital; Report of the Pennsylvania State Board of Health, 1886 and 1887; Report of the Illinois Board of Pharmacy, 1887, and Report of the Commissioner of Education for 1886–87. Appropriate acknowledgements of the same have already been made.

The Registrar read a paper by J. W. England, Ph. G., who was unable to be present, upon *tincture of mustard*. A discussion ensued upon the subject and it was suggested that it would be well to state that the maceration, after moistening the drug with water and after transferring it to the percolator, should be effected in closed vessels to prevent loss of the volatile oil.

A paper upon *hydrangin* by H. J. M. Schrœter, Ph. G., was read and listened to with much attention. Some conversation ensued and Wm. Webb remarked that when the fluid extract was introduced it was recommended to prepare it by decocting the drug two or three times in water, evaporating and adding honey, and that the entire root was used. Professor Maisch thought that the bark was probably the efficacious part of the drug, since the woody part of the root was nearly tasteless. Mr. Schrœter stated that the whole root had been employed in his experiments. Professor Maisch in reply to a query, stated that the Hydrangea arborescens was indigenous to this country and grew wild in the neighborhood of Philadelphia; but that the ornamental garden flower was the Hydrangea hortensis, a Chinese plant, the natural color of whose flowers was pink, the bluish shade frequently seen being due to the absorption of iron in the soil. The paper of Mr. Schrœter was illustrated with a number of samples, showing the reactions of hydrangin with different tests.

The third paper was by Mr. F. B. Quackenbush, of the present senior class upon *Asdepias Cornuti and A. tuberosa*; and Dr. Lowe read a short paper upon *immature cubebs*. All these papers were referred to the Publication Committee. In answer to a question Professor Maisch stated that the ovary of the cubeb flower was at first sessile, but later on, probably after fertilization produced the so-called stalk.

Dr. Lowe stated that he was not yet prepared to make a report upon the question referred to him last month; relative to the *quality of the tar* now supplied, but some enquiries had been made and enough had been learned to show that nearly all that is offered to the trade is a mixture of wood tar with coal tar.

There being no further business a motion to adjourn was put and carried.

T. S. Wiegand,
Registrar.

EDITORIAL DEPARTMENT.

The Alumni Association of the Philadelphia College of Pharmacy will celebrate their 25th anniversary by holding in the College Hall an exhibition representing the progress made in pharmacy, and allied arts and sciences, by its members. The exhibition will be held on the 13th, 14th and 15th of March, during the day and evening, from 10 A. M. to 10 P. M., and from the number of graduates and members who have already engaged space there will certainly be an interesting exhibition. It is also the intention to place upon the tables many objects illustrating the pharmacy of the past.

Filters.—Mr. Edo Claassen calls our attention to a clerical error which remained uncorrected in proofreading of his paper published in our February number. By substituting the word *millimeters* for centimeters on page 74, and the designation *mm.* for cm. referring to the illustrations on page 75, the dimensions will be more correctly indicated.

Mr. Claassen also states, that it will be found advantageous in many cases to again fold the narrow strip (indicated in the figures by dotted lines) by bringing its lower end, commencing at the angle, over to the inner crease, thus forming a small triangle; and in case the neck of the funnel should be unnecessarily large, to support the filter in a cone of writing paper, folded like a plain filter, but having the point cut off sufficiently for permitting the lower end of the filter to project through the aperture.

The excursion to the Pacific Coast in connection with the meeting of the American Pharmaceutical Association, to be held at San Francisco, June 24th, has been announced to start from Chicago, St. Louis and Memphis on Friday, June 14th, and to reach Denver Sunday morning at 7 o'clock. After a trip through Clear Creek Cañon to Idaho Springs, Georgetown, Silver Plume and Graymount, the train will leave Denver on Tuesday evening for Salt Lake City, where it is contemplated to spend two days, and then continue the journey westward so as to reach San Francisco on Sunday, June 23, at 11 A. M. The tickets on this train are limited to 150, and the price for each ticket has been fixed at $160 from Chicago, $150 from St. Louis or Memphis, and $140 from Kansas City, for the *round trip;* the ticket entitles for the *outward trip* to sleeping car and first-class hotel accommodations, meals, special carriage drives, transportation of 150 pounds of baggage, and all the necessary transfers until the hotel at San Francisco is reached. The return ticket will be good for six months.

This special train has been designated as the *Western and Southern Official train of the Association.* No arrangements appear to have been made for members residing east from the points mentioned above, but we presume that they will be announced at some future time.

OBITUARY.

Information of the death of the following graduates of the Philadelphia College of Pharmacy has been received:

Richard Price, class 1835, died in Philadelphia, November 27, 1888, aged 74 years. His thesis on senega was published in this Journal, vol. viii. p. 92.

Benjamin B. Davis, class 1850, died at Willow Grove, Pa., August 18, 1888. For a number of years he had been a resident of Eufaula, Ala.

C. Collins Hughes, class 1857, died December 4, 1888, at his late residence, Eighth and Race streets, where he had been in business for several years.

Jos. Vincent Wingert, class 1878, died at Pottsville, Pa., January 29, last. He had been in business in his native town for nearly ten years.

Thos. M. Galbreath, class 1880, a native of Maryland, died January 25, last, at Atlantic City, N. J., where he had been in business for some time.

Robert L. Hesson, of Philadelphia, class 1884, died at Curllsville, Clarion county, Pa., May 25, 1885.

John George Engler, class 1885, lost his life in his native city Hartford, Conn., on the morning of February 18, when through the explosion of the steam boilers the Central Park Hotel was wrecked and twenty-three persons were killed. Mr. Engler was a faithful student and at the time of his graduation, was awarded the John M. Maisch prize.

Everett V. Alexander, class 1886, died at his home in McConnellville, Ohio, February 19, 1889.

THE AMERICAN
JOURNAL OF PHARMACY.

APRIL, 1889.

BISMUTHYL IODIDE.

COMPARATIVE VALUE OF METHODS PROPOSED HERETOFORE, WITH AN IMPROVED METHOD FOR ITS PREPARATION.[1]

BY CHARLES E. GREENE.

Bismuthyl iodide was introduced into hospital practice in New York by Dr. A. Sidney Reynolds, about ten or twelve years ago under the name of "Bismuth-subiodide or oxyiodide." It was used for the local treatment of chronic ulcers, syphilitic sores, eruptions, etc., etc. It was said to be more efficient than iodoform, with none of the saffron-like and almost intolerable odor, so characteristic of the latter. Dr. Reynolds also claims that it will "control inflammation, allay irritation, suppress suppuration, promote granulation and induce cicatrization;" and that it is "almost a specific in gonorrhœa, and general mucous inflammations," etc. Internally it is strongly recommended in gastric ulcers, gastritis, and typhoid fever.

The objects had in view in the prosecution of the work as presented by this paper were, first, to ascertain the amount of true BiOI in the commercial article sold by the name "Subiodide of Bismuth;" second, to test the various methods proposed for the manufacture of the compound, and also to ascertain the percentage found in the products obtained by these methods; and third, to devise, if possible, a new method for its preparation that would yield a better result than any as yet known to myself.

The information which I was able to obtain, both as to the effect and as to a satisfactory mode of preparing bismuthyl iodide, was not only very meagre, but very unsatisfactory, indeed. Although considerable has been written on the mode of preparation, yet, after a great number of experiments, no one seems to have obtained a thoroughly satisfactory result. None of the products obtained were of sufficient purity, and none of the methods employed were without some serious objection; yet these investigations were made by some of the best pharmacists in our land. How far I may have been successful in my efforts in this direction I leave for others to judge. At the time of Dr. Reynolds' experiments the high cost of the compound prevented its general adoption; therefore the main point for consideration was a process by which a chemically pure compound could be obtained at a price sufficiently reasonable to bring it into general use.

---

[1] From an inaugural essay presented to the Maryland College of Pharmacy, 1889.

The first commercial sample which I examined, was of a very dark brown, almost chocolate color, with nothing of the characteristic brick red color which it should have, indicating the presence of a considerable quantity of iodine in other form of combination than $BiOI$, most probably as BiI_3. When boiled with an excess of water it assumed a much lighter color, finally a bright brick red, owing to more perfect oxidation, one atom of oxygen from the hot water replacing two of iodine forming a molecule of $BiOI$. When heated to 100° C. no apparent change took place, only a slight odor of iodine becoming perceptible. As the heat was slowly raised to cause partial decomposition and as the iodine was slowly liberated the compound gradually assumed the brick red color. By analysis I found that it contained 48·36 per cent. of iodine, or about 12 per cent. more than a pure article should contain, and we may justly draw the conclusion that this is a very indefinite and, therefore, unsatisfactory compound.

The next sample examined was, like the first, of American manufacture. It was dark-red in color, dense and heavy, and exhibited a few lumps of a lighter color. It contained 91·83 per cent. $BiOI$, with a small amount as $BiONO_3.H_2O$. One other sample was examined, but it did not differ from the one just spoken of, except that it had been more carefully powdered and contained 92·61 per cent. $BiOI$, and a small proportion of $BiONO_3.H_2O$.

Of the various processes set forth in journals and books of reference, I have tried several with varied success. The first tried was the so-called method of "precipitation," proposed by Jos. W. England, in Amer. Jour. Phar., Jan., 1887, pp. 9–15. The product by this process was of a fairly good color, but slightly darker than some other specimens, cakey, and very difficult to pulverize finely. The chief disadvantages of this method are, that the water being hot and the acid solution not being sufficiently diluted, a very appreciable quantity of iodine was liberated as vapor, giving the supernatant liquor a distinctly violet color, and readily recognizable both by the odor and by the starch test. By analysis I found the compound made by this process to contain 97·65 per cent. BiOI.

The next method was devised by R. Rother (AMER. JOUR. PHAR., Aug., 1887, pp. 390–391). Theoretically this is certainly a good method. It yields a product of a dark red color, heavy, dense, and rather hard to pulverize finely. It contains 95·3 per cent. BiOI, with 3 or 4 per cent. $BiONO_3.H_2O$; but, to say the least, the process is rather tedious and the resulting compound not so satisfactory as desired.

The next method tried was that of precipitation with hydriodic acid and freshly prepared bismuth hydroxide, as proposed by Frank X. Moerk (AMER. JOUR. PHAR., June, 1887, pp. 273–274). The author states, "the oxyiodide so obtained is of very fair color, and contains no water of crystallization." In this product, as in all others which I examined, I found no water of crystallization. That which I obtained was very tough, almost unpulverizable, heavy and cakey. So far as chemical composition is concerned it was as good as the average samples found upon the market, containing 92·9 per cent. BiOI, with some $BiONO_3.H_2O$, as in the others. But the process not only occupies too much time, but requires a great deal more skill and care than is necessary to produce a very much better article.

The next process tried was devised by the same author as the preceding one, and consists in boiling certain quantities of $BiONO_3.H_2O$ and KI together without the presence of an acid; and, as the preceding one was remarkable for being complicated, so this one is justly celebrated for being extremely simple. In devising these manipulations the author has surely touched both extremes. "The (supposed) *advantages* of this method are, first, the avoidance of *free acid;* second, its definite composition; third, a higher percentage of BiOI." The first advantage (?) I readily admit; there certainly is no *free acid* present. Yet this could be considered a good method provided the two latter advantages claimed were true for the resulting compound. The samples made by myself, after boiling for more than an hour, were found to contain only 27·6 per cent. iodine, making the resulting compound represent 76·66 per cent. BiOI, with a large amount of $BiONO_3.H_2O$, showing conclusively that large quantities of KI remained undecomposed and were lost in the washings, and that there is nothing "definite" in its composition. The washings, when tested with a solution of $AgNO_3$, gave a copious white, curdy precipitate of AgI.

Several samples were made by various other methods, as by "trituration," etc., but none of these were satisfactory, having various percentages of BiOI, from 88 to 95 per cent, with "*uncertain*" quantities of $BiONO_3{\cdot}H_2O$, differing in no special way from those already spoken of.

Of all the methods so far considered I had found no one that was entirely satisfactory. The method of "precipitation" seemed to be in all respects better than any of the others, yet it was far from being perfect. In experimenting upon this process I found that it should be modified as follows: Dissolve 409 grs. $BiONO_3{\cdot}H_2O$ in 1 fluid ounce HNO_3 with the aid of heat, as is stated in Mr. England's formula; then carefully dilute this solution with water as long as $BiONO_3$ is not reprecipitated, or, at least, until it has assumed a slight permanent opalescence. Add to this 221 grs. of KI, dissolved in about 16 fluid oz. of *cold* water, in a large flask or some suitable vessel, agitate thoroughly, and *then* apply heat, *but not to the boiling point*, (about 80°–85° C.). The mixture at first assumes a black color, growing gradually brownish, becoming still lighter as it is agitated, and under the influence of *moderate* heat and violent agitation it is finally changed from a light brown to a brilliant red. The agitation is continued for a few moments longer that the reaction may be completed. The precipitate is washed by decantation, drained upon a plain filter and dried at 100° C. The yield should be about 470 grs. The whole operation is completed in a very short while. No iodine is liberated, and hence the product contains a larger and proper percentage of it, and represents a pure article of BiOI.

Bismuthyl iodide so obtained is of a very bright red color, almost vermilion, and has the additional advantage of being in very fine powder, light and bulky, admirably adapted for use as a dusting powder or dressing, an advantage possessed by none of the other specimens. By analysis I found it to contain 35·8 per cent. of iodine, making 99·44 per cent. BiOI, with only ·35 per cent. $BiONO_3.H_2O$.

The reaction taking place in the above is most likely as follows:

(1) $BiONO_3.H_2O + 2\ HNO_3 = Bi\ 3\ NO_3 + 2\ H_2O$.

(2) $3\ (Bi\ 3\ NO_3) + 3\ KI = BiI_3 + 2\ (Bi\ 3\ NO_3) + 3\ KNO_3$.

(3) $BiI_3 + 2\ (Bi\ 3\ NO_3) + 3\ H_2O = 3\ BiOI + 6\ HNO_3$.
(heated—)

The mode of analysis which was pursued in these experiments, is as follows:—

For estimation of Iodine.—Place 0·5 gm. BiOI in a flask with a few pieces of test zinc, cover with water, and mix thoroughly, then add sufficient H_2SO_4 to evolve hydrogen slowly, at the same time decomposing the BiOI. Thus *H* combines with *I* to form hydriodic acid, while $ZnSO_4$ is formed and Bi is precipitated in black flocculent masses. This reaction is completed in two or three hours. Neutralize the resulting mixture carefully with KHO, add a few drops of solution $K_2\ CrO_4$ as an indicator; titrate with one-tenth normal solution of $AgNO_3$ until a red precipitate begins to form. The percentage of iodine is then calculated as by U. S. P. process.

For estimation of Bismuth.—Dissolve 0·5 gm. BiOI in a small quantity of nitric acid, dilute with water, boil until all iodine has been vaporized and all odor of HNO_3 has disappeared; add to this KHO, until a precipitate is formed which does not redissolve on shaking. Collect on a plain filter, wash well, ignite and weigh as Bi_2O_3.

MEDICINAL CATECHU.

By Edwin Stanton Reider, Ph.G.

From an Inaugural Essay.

The examination and estimations presented in this essay were undertaken with the view of ascertaining the medicinal worth of catechu as it is found in the drug market. Eighteen samples were obtained from various sources and the results gotten from these were considered to be a fair indication of the condition of the drug in general.

Samples 1 to 6 were in powdered state, the remainder were in mass. Nos. 1, 2, 7 and 8 were obtained from Baltimore, Md., direct from the jobbers. Nos. 11, 15 and 16 from the same city, but received through retailers. Nos. 5 and 9 were procured from a wholesale drug-house in New York City. The remaining samples were all gotten in Philadelphia; Nos. 10 and 14 from retail pharmacies, the remaining eight from prominent wholesale establishments. Concerning No. 17, it might be stated that it is neatly put up in four-ounce packages and labelled "Catechu Pallidum."

The impurities which these examinations disclosed consisted mainly of leaves, sticks, pebbles and dirt of various sorts. The possibility of the presence, in the drug markets, of catechu that had been treated with potassium-bichromate for dyers' use—as was pointed out in a recent paper (AMER. JOUR. PHARMACY, Oct., 1888), was the incentive for a thorough search, in each sample, for this dangerous impurity, but its absence was proven in every instance. By reference to the appended table it is seen that the moisture ranges from 7·99 per cent. to 14·47 per cent., the powdered samples containing an average of 11·63 per cent. and those in mass 11·65 per cent.

The average yield of ash was very large, No. 14 giving 19·61 per cent., the largest. This sample consisted principally of sticks, leaves and sand, hardly meriting the name catechu. No. 7 showed the lowest ash percentage, *viz.*, 1·67 per cent.; four other samples yielded less than 3 per cent. No. 17, when ignited for ash gave off a strong odor of burning nitrogeneous matter, and when a portion of the sample was dissolved in hot water the solution had a decided and strong cheese-like odor.

It was noticeable that those samples giving the highest ash percentage also contained iron in the largest proportions, this being especially true of Nos. 2, 9, 14 and 16, all of which gave evidence of its presence in large amounts. The other samples also contained iron in varying amounts, some, notably No. 18, showing its presence but slightly. Nos. 1 and 2 also had aluminium present in small quantities.

The catechu estimations were made as follows: A 1 per cent. solution (0·5 gm. in 50 cc.) of the catechu, in hot water, after cooling, was shaken up with successive portions of stronger ether, the ethereal layer separated after each treatment; these several ethereal solutions were then mixed together and the ether evaporated. The ethereal residue was again treated with stronger ether to dissolve away the *catechin* from that portion of the aqueous extract which had remained mixed with the first ethereal solutions. This last solution was again evaporated, the residue being pure catechin. As the table shows, the yield of catechin was quite small, the greatest amount obtained from sample No. 11 being 16·50 per cent. The superiority of this specimen over the average commercial catechu was shown also by its dissolving in hot water almost without insoluble residue and giving a very light colored solution. No. 7, although giving a small proportion of catechin, yielded it in a most attractive crystalline form.

To sum up these results, we find that the catechu generally present in the drug market contains small proportions of catechin and correspondingly large amounts of impurities; almost invariably contains iron, and, as far as these results indicate, none has been found to contain potassium bichromate.

Following is a general synopsis of the results obtained:

Sample.	Moisture.	Ash.	Catechin.	Remarks.
1	10·16 per cent.	3.77 per cent.	3·73 per cent.	Iron, trace: aluminium, trace.
2	10·30 “	13.35 “	4·60 “	Iron, considerable; aluminium, trace.
3	14·18 “	3·10 “	7·20 “	Iron, trace.
4	9·57 “	2·99 “	2·60 “	Iron, trace.
5	13·14 “	5·83 “	1·53 “	Iron, trace.
6	12·44 “	4·31 “	4·20 “	Iron, trace.
7	14·47 “	1·67 “	2·40 “	Iron, trace.
8	9·12 “	2·39 “	5.40 “	Iron, trace.
9	15·13 “	4·88 “	1·20 “	Iron, considerable.
10	14·14 “	2·18 “	5·20 “	Iron, slight trace.
11	12.15 “	6·82 “	16·50 “	Iron, trace.
12	9·47 “	2·40 “	3·00 “	Iron, slight trace.
13	13·13 “	4·62 “	4·80 “	Iron, slight trace.
14	7·99 “	19·61 “	2·20 “	Iron, considerable.
15	8·57 “	3·88 “	3·00 “	Iron, trace.
16	12·00 “	5·88 “	3·80 “	Iron, considerable.
17	10·82 “	5.04 “	1·00 “	Iron, trace.
18	13·57 “	3·08 “	2·80 “	Iron, very slight trace.

AN ADULTERATION OF GROUND FLAXSEED.

By George M. Beringer, Ph. G.

Read at the Pharmaceutical Meeting, March 21st.

A sample of ground flaxseed recently offered showed upon examination the following peculiarities: With iodine, the decoction gave a copious reaction for starch; it yielded to petroleum ether 20·92 per cent. of oil; ash, 3 per cent. On examining the sample microscopically the starch was identified as that of corn.

A sample of pure ground flaxseed gave no reaction for starch, and yielded to petroleum ether 32.97 per cent. of oil; ash, 4·5 per cent.

The sample offered was evidently adulterated with corn meal to the extent of about forty per cent., judging from the small yield of oil and ash.

A sample of corn meal examined yielded to petroleum ether only 2·65 per cent. of oil; ash, 1·2 per cent.

The adulteration of ground flaxseed with such material is likely quite common, and may be easily detected by the test for starch. It is a well-known fact that, although flaxseed may contain starch while growing, in the fully matured seed the starch is entirely converted into albumen and oil. The writer suggests that the Pharmacopœia should require flaxseed to give with iodine no reaction for starch. As most flaxseed yields considerably over 30 per cent. of oil, I am also of the opinion that the Pharmacopœia should require it to yield not less than 30 per cent., instead of 25 per cent., as in the present edition.

OLEATE OF MERCURY.

By A. P. Brown, Ph. G.

Read at the Pharmaceutical Meeting, March 21.

Several years ago Dr. Wolff read a paper on "Oleates" (see American Journal of Pharmacy, 1881, p. 545), and recommended them to be made by decomposing sodium oleate (white castile soap) with a soluble salt of the desired metal. For instance, to make oleate of zinc, a solution of acetate of zinc is added to a solution of oleate of sodium; a white precipitate will fall which, when washed and dried, is termed powdered oleate of zinc. For making oleate of mercury, a solution of oleate of sodium is added to a solution of bichloride of mercury, the mixture becomes milky and in order to separate the oleate of mercury it is necessary to boil the mixture until the oleate forms a yellow mass, when the remaining liquid is poured off and the oleate washed with water, transferred to an evaporating dish and on a water bath heated until all the water is driven off.

Now, in preparing oleate of mercury according to this process, the continued boiling will decompose the oleate and a black precipitate will also form, and instead of being of a beautiful yellow color, a dark mixture resembling mercurial ointment would be the result, consisting of a mixture of oleate and oxide of mercury.

Having occasion to use considerable quantities of oleate of mercury made by this process, I was anxious to have a nice reliable preparation for dispensing, and it occurred to me that the process might be improved by adopting the following plan:

Take of white Castile soap, in fine powder, ℥viii; bichloride of mercury, in fine powder, ʒiij+ʒij. Mix them carefully together in a mortar and add distilled water sufficient to form a pasty mass; throw this immediately into boiling water, and boil carefully until a yellow oily liquid is formed; allow to cool, pour off the water and wash the resulting oleate with distilled water until tasteless; place it in an evaporating dish and on a water bath heat until all the water is driven off. By following this process an oleate of mercury will be obtained resembling very much recently prepared citrine ointment. This can be diluted with lard or lanolin to any desired strength. In a paper by Dr. Shoemaker these oleates are recommended to be used in skin diseases; and in speaking of oleate of mercury, he calls it a pure oleate of mercury, and recommended it to be diluted when used; for instance, to make a twenty-five per cent. ointment, it was to be diluted to one-fourth; or for a twenty per cent. ointment, to be diluted to one-fifth. He recommended lard as the best diluent; vaselin or cosmolin being not so readily absorbed as lard. In my experience I have found lanolin to be the best diluent, as it is more readily absorbed than any of the above. On the table are two specimens of oleate of mercury—one proposed by Dr. Wolff's process, and the other by the modified method. They are both over a year old, and perfectly sweet, as on the day they were made.

OLEORESIN OF MALE FERN.

By Wm. G. Greenawalt, Ph. G.

"Ethereal oil of male fern deposits a sediment. Is this, or the overlying oil, the active portion?" About six years ago this question appeared in the list of queries published by the American Pharmaceutical Association, and thereafter appeared in each successive list for the next two or three years, when it was finally dropped without any investigation having been made.

In the fall of 1885, my attention was called to the query, and I determined to investigate and if possible find which is the active portion. The U. S. P., and all the literature I could find on the subject, concedes to the sediment active properties, directing it to be shaken up with the oil before administration.

The first thing to be done was to separate the sediment from the oil, and for this purpose various liquids were tried, in order to select the best. Chloroform dissolved both oil and sediment, forming a clear liquid. Deodorized benzin and absolute alcohol both seemed to answer very well with the small portion tried; but anxious to know whether there was a difference, I experimented further, and found that after dissolving the oil and decanting, then washing the sediments with the respective liquids until the washings were nearly colorless, and then drying the sediments, that the quantity of sediment from the benzin was much greater than the yield from the alcohol, had more color, and seemed to consist principally of resinous matter, with a few white specks mixed with the brown powder. The quantity of sediment from the absolute alcohol was comparatively small, and consisted largely of the white portion, with a small quantity of the brown powder.

The quantity of the oil from the benzin was correspondingly smaller, as the yield of sediment was larger than that from the absolute alcohol, and consisted principally of the oil, while that from the alcohol deposited after standing several weeks quite a quantity of resin, which I found to be insoluble in benzin, thus explaining the larger yield of sediment from the benzin.

As I desired to separate the sediment I concluded from the above, that deodorized benzin would be the better liquid, and prepared several doses in this manner.

But, after doing all that I could do myself, I experienced a good deal of trouble, owing to the difficulty in getting a physician to aid me who would be willing to experiment with his patient. However, after several disappointments I was enabled to try the virtue of the overlying oil through the kindness of Mr. Frank Greenawalt, then a medical student in our town, who administered the dose of oil on the 19th of June, 1887. The dose was taken at 6 o'clock A. M., the patient having taken no nourishment the previous evening other than a glass of milk, and a glass of milk in the morning. At 8 o'clock, an ounce of castor oil was given, and between the hours of 12 o'clock noon, and 4 o'clock P. M. about 15 feet of tapeworm, with the head, was passed.

This was certain evidence, that there is virtue in the oil; but now the trouble was to test the sediment, and I experienced the same difficulty as before, but finally, after waiting nearly two years, I had an opportunity to try it, through the kindness of Dr. P. Brough Montgomery, who administered the dose of sediment on the evening of February 8th, 1889, the patient having fasted during the day. The next morning a dose of castor oil was taken, and that day 14 yards of tapeworm were passed.

This would show that both the sediment and the overlying oil possess active properties, the sediment being as active as, if not more so, than the oil, and that it could be separated from the nauseating oil and administered with the same result, as from a dose of the oil and resin. It has the additional advantage of greater convenience, as the capsules could be filled and kept in stock.

NOTE BY THE EDITOR.—Although some works of reference give the dose of filicic acid as a tænifuge, and all works direct the oleoresin of male fern to be dispensed with the sediment, references to actual experiments are rarely met with. Bernatzik and Vogl (*Arzneimittel-Lehre*, p. 7), state: "Carlbloom (1866) declared filicic acid to be the therapeutically active substance of male fern, and recommended it as a remedy for cestoda in powder form (dose 0·12 gm.); but it appears to be not the sole active principle, since Rulle (1867) found the impure filicic acid (from the ethereal extract) more active than the pure acid."

A NEW MEDIUM FOR MOUNTING STARCHES AND POLLENS.

BY A. P. BROWN, PH. G.

Having occasion to mount a variety of starches for examination under the microscope, I have been looking for a suitable medium that would best show the structure and at the same time preserve the specimen. The students of the class in microscopy at the Philadelphia College of Pharmacy are desirous of preserving the different starches that are given to them for examination during the course; but until recently I have not been able to give them, for mounting for Starches, Pollens and similar vegetable substances, a medium that would have the advantage of showing the structure of the specimen after it had been finished and preserved for future reference. Balsam of fir makes starches too transparent. Glycerin is good, but it is almost impossible to find a cement that would hold it, on account of its solvent properties. Carbolic acid and water in time dry out. Cosmolin has been recommended, but it is too greasy and it has the same fault as glycerin; it is almost impossible to find a cement that will hold it.

A short time ago Mr. Charles Bullock spoke to me of a new medium he had been using to mount vegetable tissues; it struck me as being the very article for mounting starches in. I prepared some and found it to answer the purpose admirably; it is as follows:

Selected Gum Arabic	℥ij.
Glycerin	
Distilled Water, of each	f ℥iss.
Thymol	gr. i

These are all placed in a wide-mouth bottle, which is corked carefully to exclude dust, and placed in a warm situation. It takes several days to effect a perfect solution, the mixture being stirred up occasionally. When all is dissolved strain through linen, and set aside the liquid about a week longer to get rid of air bubbles and to allow any small particles that may have passed through the strainer to settle to the bottom; or it can be filtered through absorbent cotton by using a funnel for hot filtration, which consists of a double tin case holding water, kept at the required temperature by a spirit lamp placed under the projecting arm. A glass funnel fits inside of the hot water bath, a plug of absorbent cotton is placed in the funnel, and the solution is passed through it. After filtration it is best preserved in compressible tubes.

To mount starches or pollens, a clean slide is breathed on and then dusted over with the starch or pollen to be mounted; the surplus is removed by gently tapping the slide against any hard substance—a table, for instance. Enough of the starch will adhere to the slide, and will be nicely distributed over the field. A drop of the mounting medium is now placed on the slide carefully and the cover placed over it. If there are any air bubbles in the mounting medium when placed on the slide they should be carefully picked out with a mounting needle. If the medium is kept in a compressible tube there is not much danger of air bubbles on squeezing out a drop; or if there are any, they will be on the surface, and can be readily removed with a mounting needle. The slide can then be finished immediately by running a ring of any kind of cement around the edges of the cover glass, and the mount is permanent.

The medium can be colored blue by adding a small quantity of aniline blue, although it is not necessary, as the structure of the starches can be plainly seen. They should be examined by central and oblique illumination, and with the polariscope, to give the student interested in this subject an idea of the beauty of starches and pollens.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the American Journal of Pharmacy.

Hysterionica Baylahuen.—Prof. Dujardin-Beaumetz received samples of this plant from Chili, where it is thought to have special action in certain gastro-intestinal troubles (especially in chronic, hemorrhagic recto-colites), indigestion, flatulent dyspepsia etc. He gave the samples to Dr. Baillé who gives the results of his studies in the *Bull. gén. de thérap.*, February 23d. A close anology was found to exist between this plant and Grindelia robusta, though Dr. B. writes that he has not been able to find the substance (analogous to saponin), cited by Mr. Henry Clark in the Am. Journ. Phar., Sept. 1888, and called by him grindelin. Dr. B. made a tincture of hysterionica by macerating 100 gm. of the plant in 500 gm. of strong alcohol for 10 days; dose 15 to 35 drops. Doses of 20 drops appear to have given excellent results in two cases of chronic bronchitis. The action seems to be similar to that of other balsamics but it is better tolerated. Its action was excellent in obstinate diarrhœas which had not been benefitted under opium and sub-nitrate of bismuth; also in the late and persistent diarrhœa of phthisical subjects. Dr. B. thinks it acts as "a kind of antiseptic dressing upon the intestinal surfaces." It exerted a notable amelioration in two cases of cystitis. It also gave good results as a dressing for open wounds, and in two cases of varicose ulcer. The author favors the use of an infusion of 1 part of the plant in 150 parts of water.

Ergosterin.—Recent researches made by M. Tanret, seem to show that the crystallizable principle of ergot of rye, which was formerly regarded as cholesterin, differs in composition from that substance and its isomeric bodies, though the resemblance is such as to justify the name, ergosterin, which he has given to it. Ergosterin is isolated by exhausting ergot with alcohol, distilling and washing the extract with ether, and distilling the ether, the product being an oily mass filled with crystals. These are separated and recrystallized in alkaline alcohol, and then in pure alcohol. The product is about 2 to 1000. The formula is $C^{52}H^{40}O^{2},H^{2}O^{2}$. The substance is insoluble in water, and soluble in alcohol, ether and chloroform; it melts at 154° C. (309° 2 F). It oxidizes slowly in the air; it is not attacked by concentrated and boiling alkaline solutions. It is, like cholesterin, a monatomic alcohol. With nitric and hydrochloric acids and iron perchloride, its reactions are the same as those of cholesterin. But concentrated sulphuric acid colors the latter brown, and makes an incomplete solution, which, agitated with chloroform, gives an orange yellow color passing to red, and then to violet. Concentrated sulphuric acid completely dissolves ergosterin however, and when the solution is agitated with chloroform the latter remains colorless, though, on evaporation, a faint violet coloration appears if a notable quantity of ergosterin be used. *Comptes rendus de l'Acad. des Sci.*, Jan. 14, 1889; *Répert. de phar.*, Feb. 10.

Oleandrine and Nereine.—In a recent article (*Nouv. rem.*, Feb. 8), on the comparative value of the extracts and the alkaloids of plants, Dr. Bardet writes thus: "I am surprised that Prof. Sée should consider as settled the question of the similarity of oleandrine to digitalein, and of nereine to digitalin. I do not know if M. Sée has ever possessed these substances, but I have sought for them in the market for a year without being able to procure them. I have, with M. Adrian, tried to get a defined active principle from oleander, but we have not succeeded in getting more than a very active extract. In fact, oleandrine and nereine have no practical existence. Like many of the alkaloids, they are purely scientific products, found once, and sometimes sought for afterwards in vain. Druggists will perhaps dispense a substance obtained by an indicated process for oleandrine, but it will be no more than an unknown residuum."

Toxic Power of Digitalis.—At a meeting of the *Société de Biologie*, M. Roger said: "The toxicity of digitalis diminishes very notably when the product of maceration is concentrated by the water-bath. Thus, a 5 per cent. maceration, which is toxic in doses of 2 cgm., no longer kills save in doses of 1·8 gm., when it is concentrated by 4 per cent. If reduced by 6·6 per cent., 3 gm. would be required to produce the same toxic effect.—*Nouv. rem.*, Feb. 24.

A Dangerous Chlorate of Potassium Prescription.—A pharmacist writes to the *Bull. com.*, Jan., stating that he often gets a prescription as follows: Chlorate of potassium, 5 gm.; dist. water, 120 gm.; simple syrup, 30 gm.; a dessert spoonful every half hour. "Children who take this," adds the pharmacist, "*always die.*" M. Brouardel cites six cases of death in children after using a similar potion. Can I refuse to dispense this mixture?" The editor says the pharmacist cannot refuse; he can only state the facts to the doctor, "who will be likely to attribute the cause of death to the gravity of the disease." He adds: "Physicians, on account of the scant information we have as to the physiological action of chlorate of potassium, use this medicament with the same imprudence and the same indifference as they have formerly shown."

PROF. BALL'S PURGATIVE PILLS.—The *Répert. de Phar.*, Feb. 10, gives, by permission, the formula of a pill which appears to have become popular with Parisian prescribers. It is as follows: Aloes (soc.), 1 gm.; res. scammony and jalap of each, 50 cgm.; calomel, 50 cgm.; ext. belladonna and hyoscyamus of each, 25 cgm.; medicinal soap, q. s. (about 2 gm.). Make 50 pills. Dose, 3 to 5 daily.

PETROLATUM CERATE.—M. Nicot (*Bull. gén. de Thérap.*, Feb. 15), praises this composition, which he describes as being "a very unctuous and homogeneous preparation of immaculate whiteness." He adds that petrolatum, which is a good excipient in most ointments, need not be thought out of place for cerate. His formula is: White petrolatum, 500 gm.; oil of sweet almonds, 50 gm.; white wax, 50 gm. Melt with gentle heat and mix in a warm mortar, adding slowly, 50 gm. of rose-water. For *cold cream* the white wax should be replaced with spermaceti.

DETECTION OF ACETONE IN URINE.—Add to the urine a few drops of a concentrated solution of nitro-prussiate of soda, and make the solution alkaline by adding potash. A red coloration appears and then goes off; add acetic acid, and, if acetone be present, we get a dark violet color. To find diacetic acid, perchloride of iron is used; it gives a dark red color. Urine containing thalline, antipyrine and salicylic or phenic acid gives the same reaction with perchloride of iron, but with diacetic acid the color disappears on boiling. If urine be boiled before adding the perchloride of iron, the reaction does not take place in the case of diacetic acid, but occurs as usual with the other substances. Urine should be subjected to analysis as soon as possible, lest the diacetic acid decompose into acetone and carbonic acid.—*Bull. de la Soc. de Phar. de Bordeaux; Nouv. rem.*, Feb. 24.

Preparation of Iodoform.—Fifty parts of potassium iodide, six parts of acetone and two parts of sodium hydroxide are dissolved in one or two litres of cold water. Into this mixture there is poured, drop by drop, with constant stirring, a dilute solution of sodium hypochlorite. Iodoform is quickly produced and precipitated. Further addition of hypochlorite is made until the acetone or all of the iodine has disappeared.—H. Sulliot and H. Raynaud, in *Bulletin de la Société Chimique de Paris*, Vol. 2, No. 1.—C. B.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Mœrk, Ph. G.

Creolin.—Th. Weyl, in *Ber. d. D. Chem. Ges.*, 1889, 138, gives analyses ot the two brands found in the market at the present time; it will be seen that they only have the name in common. Pearson's article is quite soluble in ether which is a simple distinctive test.

	Pearson's.	Artmann's.
Hydrocarbons	56·9	84·9
Phenols	22·6	3·4
Acids	0·4	1·5
Sodium	2·4	0·8

Meconarceine and Meconate of Narceine.—A French preparation under the former name, according to E. Merck, appears as a neutral yellow solution, odor of camphor, containing 0·5 per cent. alkaloid, composed chiefly of codeine, with some narceine, combined with an ether-soluble acid. A German firm has introduced a white powder sold indiscriminately under the above names, which is a mechanical mixture of narceine and meconic acid, melting at 110°; in dissolving this powder a chemical reaction takes place and the recrystallized product melts at 126°. Pure meconate of narceine was obtained by uniting equal molecules of narceine and meconic acid; it is of a lemon-yellow color, soluble in boiling water, the solution possessing an acid reaction; difficultly soluble in alcohol, the best solvent is 50 per cent. alcohol; melts at 126°.—*Pharm. Ztg.*, 1889, 90.

Picrotoxin is recommended by Prof. Bokai as the most rational antidote for morphine, it having been experimentally demonstrated to possess properties directly antagonistic to those of morphine.—*Apoth. Ztg.*, 1889, 139.

Dammar contains, according to researches of B. Graf: 1 per cent. of a dibasic acid, formula $C_{18}H_{33}O_3$; 40 per cent. insoluble in alcohol, which is not a hydrocarbon as has been announced, but which still contains some 2 per cent. oxygen, melts at 140°–145°; and about 60 per cent. soluble in alcohol of formula $C_{20}H_{42}O_2$, containing one alcoholic hydroxyl group, does not possess acid properties, melts at 61°. —*Arch. der Pharm.*, 1889, 97.

Tests for Creasote:—1. Specific gravity 1·070–1·080 (xylenol and phlorol have specific gravity 1·036, guaiacol 1·117, creasol 1·089); 2. the presence of guaiacol and creasol, indicated by formation of potassium salts insoluble in alcohol, is ascertained approximately quantitatively by thoroughly shaking 1 cc. creasote and 10 cc. of a solution containing 50 gms. potassium hydrate dissolved in 200 cc. 96 per cent. alcohol; the test after a short time should yield a solid mass not disturbed by brisk agitation; 3. 4 cc. water, 4 cc. sodium hydrate solution and 2 cc. creasote should produce a perfectly clear light-yellow solution, a turbidity indicating indifferent oils, a darkening other constituents of the wood-tar; 4. the glycerin test for carbolic acid.—W. Brandes, *Arch. der Pharm.*, 1889, 111.

An insect powder with the suggestive addition "fortior," containing 10 per cent. powdered quillaia is *claimed* to be superior to the pure powder, but Caesar and Loretz proved experimentally the inertness of pure powdered quillaia as an insecticide, hence, also the inferiority of this stronger insect powder.—*Rdsch.*, 1889, 146.

Freezing mixtures containing crystallized carbon dioxide. At ordinary pressure this substance lowers the temperature to —60°, in vacuo to —76°; with ether, normal pressure, to —77°, in vacuo to —103°. By dissolving in methyl chloride —82° is reached, in sulphuric anhydride —82°, in amyl acetate —78°, in chloroform —77°, in alcohol —72°, in ethylene chloride —60° and in methylene chloride as low as —106° C.—Cailletet and Colardeau (Compt. rend.) *Oester. Ztsch. f. Pharm.*, 1889, 82.

Potassium sulphocyanate frequently is contaminated with small quantities of ferrous salts which cause the crystals on exposure to assume a red color. To purify such specimens J. Kranzfeld dissolves in dilute alcohol and adds ammonium sulphide; the ferrous sulphide is removed by filtration, the filtrate concentrated and allowed to crystallize over sulphuric acid.—*Pharm. Ztschr. f. Russl.*, 1889, 68.

Salicylic acid may be distinguished from carbolic acid and resorcin by adding to an aqueous solution a few drops of a ferric solution and then lactic acid; the addition of a single drop of this last reagent changes the violet color, due to carbolic acid and resorcin, to a yellowish-green, while that due to salicylic acid is not affected until more than ten drops have been added.—L. v. Itallie, *Apoth. Ztg.*, 1889, 100.

Podophyllin, the active principle of which is podophyllotoxin, may be assayed by extracting 1 gram with cold chloroform, evaporating the greater portion of the solvent and pouring the solution into twenty volumes of petroleum ether; the podophyllotoxin is collected upon a tared filter, dried and weighed. Commercial samples of podophyllin yield from 20 to 30 per cent. podophyllotoxin.—A. Kremel, *Pharm. Post,* 1889, 105.

Bor-ice, a patented artificial ice is made by freezing a solution of boric acid or borax. After the melting of the ice the antiseptic addition becomes active and lengthens the time of preservation.—*Rdsch.,* 1889, 174.

Cherry-gum and glue as substitutes for gum arabic in making emulsions have been experimented with by F. Stokowetzki who finds that cherry-gum used in the proportion of 1 part gum to 2 parts oil makes a very thick emulsion; in the proportion 1 to 8 a watery emulsion results and, hence, easily separates; the proportion 1 to 4 gives the consistence of a good emulsion; the partial solubility of the gum gives the emulsions an unelegant appearance due to the presence of the suspended particles of bassorin; but by pouring through a fine sieve the coarse particles are removed and a more attractive preparation results. The addition of sodium bicarbonate to such an emulsion causes an immediate separation with formation of a brown color. Glue gives emulsions in the proportion 1 to 2 of excellent appearance, not to be distinguished from those made with acacia and not affected by sodium bicarbonate. The odor of the glue is masked but not so the taste; while it is probable that the taste of the glue by careful preparation may be remedied, it is doubtful if the substitute should be used, especially for persons having digestive troubles.—*Pharm. Ztschr. f. Russl.,* 1889, 84.

Sealing-wax, indifferent to alcohol.—5 parts beeswax, and 1 part each carnauba-wax and paraffin are melted together and heated with 5 parts red-lead and 2 parts prepared chalk, with constant stirring, until the mixture becomes thick.—*German patent, Rdsch.,* 1889, 176.

Sulfonal.—The preparation of this chemical involved the formation of ethyl-mercaptan (of such disagreeable odor that factories had to be erected distant from inhabitation) by distillation of ethyl-sulphuric acid and potassium sulphhydrate, condensing this with acetone to form mercaptol which on oxidation with potassium permanganate yields sulfonal. A recent patent granted to the Farben-fabriken (formerly Fr. Bayer & Co.) allows of the manufacture without the isolation of mercaptan; ethyl chloride or bromide acting upon sodium thiosulphate forms sodium ethyl thiosulphate which when treated with HCl by addition of H_2O splits into ethyl mercaptan and acid sodium sulphate;

the ethyl mercaptan in the nascent state and presence of HCl condenses with acetone to form mercaptol (yield about 70 per cent.) which by dilution with water is separated, then removed and oxidized by $K_2Mn_2O_8$.—*Pharm. Ztg.*, 1889, 98.

Genuine raspberry syrup can be distinguished from manufactured preparations by treating, 1., 2cc. of the syrup with 4cc. dilute hydrochloric acid and a few fragments of zinc. It becomes colorless after a few hours, but genuine syrup by agitation and exposure to the air reassumes the original color, while imitations will not; 2., after decolorizing by use of sodium sulphite and adding nitric acid, if genuine, the red color reappears.—H. W. Bettink, *Pharm. Ztg.*, 1889, 99.

Arsenic in glycerin.—E. Ritsert in examining commercial glycerin finds all specimens to contain arsenic if examined by Gutzeits' test (AM. JOUR. PHAR. 1889, 133). After testing the reagents the procedure is to place 1cc. glycerin, 1cc. water, 15 drops hydrochloric acid and 0.6 zinc in a long test tube and allow the gas to act upon filter paper moistened with a strong solution of silver nitrate. The reaction was not due to H_2S or H_3P as the addition of iodine solution did not prevent the reaction. The presence of the arsenic is traceable to the sulphuric acid used in decomposing the fat. Ammoniacal silver solution is a good test for arsenic (AM. JOURN. PHARM. 1889, 23), dependent upon the quantity present there is produced a mirror, gray deposit or an opalescence.—*Pharm. Ztg.*, 1889, 104.

Capsaicin according to A. Meyer is present exclusively in the placenta of Capsicum annum, the other portions of the fruit being entirely free from it. The placenta of 5000 gm. red pepper weighed 110 gm. which contained 0.9 per cent. capsaicin or for the whole fruit 0.02 per cent. The isolation was effected by extracting with boiling ether, evaporating, mixing with oil of sweet almonds (to retain the red coloring matter), extracting with 70 per. cent. alcohol, evaporating, dissolving in solution of potassium hydrate free from carbonate, filtering and passing into the filtrate CO_2 to saturation; after standing some days the capsaicin crystallizes out and is purified by washing with water and cold benzin.—*Pharm. Ztg.*, 1889, 130.

Thymol gives the following reaction, not obtained with other phenols. A few drops of potassium hydrate solution added to a solution containing thymol, followed by sufficient iodine dissolved in potassium iodide to impart a faint brown color, on moderate heating, develops a red color, gradually becoming more intense. 0.00005 gm. in 1cc.

water can be detected by this test.—L. v. Itallie, *Apoth. Ztg.*, 1889, 197.

Salicylate of zinc is made rapidly and cheaply by boiling for several minutes 34 parts sodium salicylate, 29 parts zinc sulphate and 125 parts water; after cooling the mass of crystals is collected on a filter, washed several times with small portions of water and finally, recrystallized from boiling water. The salt has the formula $Zn(C_7H_5O_3)_2$ $2\ H_2O$; 1 part dissolves in 25.2 parts water and in 3.5 parts alcohol; the anhydrous salt dissolves in 36 parts ether and 450 parts chloroform. For external use it can be applied as a fine powder or salve, also as a solution in collodium.—L. v. Itallie, *Pharm. Ztg.*, 1889, 131.

Color reactions of some volatile oils.—Oil of peppermint dissolved in alcohol after addition of a little finely powdered sugar gives on heating with HCl or dilute H_2SO_4 an intense blue-green color. Menthol does not give this reaction. *Oils of cloves, cassia and pimenta* with an alcoholic phloroglucin solution and HCl give intense red colors; with resorcin in the same way oil of cloves yields a red violet color, oil of cassia a vermilion red color, oil of pimenta a dirty violet color. —A. Ihl, *Chem. Ztg.*, 1889, 264.

Quantitative separation of brucine and strychnine.—The difference in behavior towards oxidizing agents allowed J. E. Gerock to formulate a method by which these two alkaloids could be estimated; it is dependent upon the decomposition of brucine by means of dilute nitric acid, the products of decomposition not possessing alkaloidal properties. The picrates of the alkaloids acting like the latter, from neutral solution at the temperature of the water-bath the alkaloidal solution is precipitated by picric acid, after standing for a short time the precipitate is collected upon a weighed filter, washed with cold water until the washings are colorless, dried at 105° and weighed. The precipitate is transferred, as completely as possible, to a beaker and nitric acid sp. gr. 1·056, warmed on a water-bath, is repeatedly passed through the filter to decompose any unremoved brucine picrate; the nitric acid is then added to the precipitate in the beaker and this placed on a water-bath for some time; by carefully neutralizing, adding a trace of acetic acid and allowing to cool, the strychnine picrate is reprecipitated, collected on the previously used filter, washed, dried and weighed. The difference between the two weighings represents the brucine picrate (anhydrous). Control experiments agree very well.—*Arch. der Pharm.*, 1889, 158.

ON SOME NEW TESTS FOR TANNIC AND GALLIC ACIDS.

By S. G. Rawson, B. Sc.

The ordinary reagents which are used in detecting these acids are ferric chloride, which gives its well-known reaction with both, and a solution of gelatin which reacts only with tannic acid. In the case, however, of a dilute solution of tannic acid no precipitate is obtained with gelatin; and hence considerable difficulty arises in distinguishing between the two acids. Young's test for these acids, *viz.*, potassic cyanide, I found to work well, giving a reddish color with gallic acid and none with tannic acid.

If a solution of tannic acid be treated with ammonium chloride alone a precipitate falls, but only with extreme slowness; whereas on the addition of ammonia a beautiful white precipitate instantly appears, but this, probably by oxidation, becomes rapidly of a reddish brown color. With gallic acid no precipitate falls in either a strong or a weak solution, but the liquid becomes of a red color. In a solution of tannic acid containing one part of tannic acid in 5000 of water a precipitate falls, but slowly, and with more dilute solutions, therefore, it is better to drop the mixture of ammonic hydrate and chloride very cautiously on to the top of the tannic acid solution. Where the two liquids come in contact with one another the white precipitate makes its appearance at once in a well-marked line. This white line is distinctly visible in a solution of tannic acid containing 1 part in 20,000 of water. If, however, a piece of black paper be held behind the tube the delicacy of the test is increased and 1 part in 50,000 parts of water may be now detected. There is no advantage in substituting other ammonium salts such as the phosphate, carbonate or oxalate for ammonium chloride.

With gallic acid, as previously mentioned, no precipitate is formed; but a ring, usually of a greenish color on its lower surface, is produced, this being recognizable in solutions containing 1 part of gallic acid in 100,000 of water.

Some few experiments were tried, in the case of tannic acid, with a view to using the method as a quantitative one; but owing to the unstable nature of the precipitate in alkaline solution, this attempt was, as I anticipated, a failure.

Another delicate test for both gallic and tannic acids is to add to the solution containing one of them chlorine water and then ammonia, a beautiful red color being at once produced. With tannic acid the color is very well marked and distinct, but is not quite so noticeable with gallic acid, for with this acid, as is known, ammonia alone gives a red color. With a mixture of potassic ferri-cyanide and ammonia both acids also give a dark red colored solution. In the case of tannic acid 1 part in 10,000 of water gives a distinct red color to the whole of the solution. In a weaker solution, say 1 part in 30,000 of water, the red color is best seen by looking down the test-tube through the whole column of the liquid. In still more dilute solutions, containing only 1 part tannic acid in 100,000 of water, it is better to compare the tint, which is now more of a yellowish brown, with the tint of a blank experiment, *i. e.*, one containing the same amount of ammonia and of potassic ferricyanide in the same volume of water, but with no tannic acid present. Under these conditions the change in color will be perfectly apparent, and the delicacy or the reaction may be carried considerably further. The red coloring matter can be salted out, and I am at present engaged on some further investigations into its composition and properties.—*Chemical News*, Feb. 1, p. 52.

University College, Liverpool.

NOTE ON GLYCERINUM ACIDI GALLICI.

By G. Melvin.

A short time ago I had occasion to dispense the following mixture:—

℞	Glycerin. acid. gallic	℥i.
	Acid. sulph. dil	ʒii.
	Ext. ergotæ liq	℥ss.
	Aq. cinnamomi	ad ℥viii

Misce.

It was sent out a perfectly bright mixture, but was returned a few hours afterwards with a message that some mistake must have been made. The gallic acid had separated in bundles of large acicular crystals. It was stated that the mixture had been previously dispensed at different pharmacies and had never shown the same separation of crystals before. The mixture was again dispensed with a precisely similar result, and to obviate the difficulty an additional half ounce of glycerin was added to it and sufficed to keep the acid in solution. The glycerin. acid. gallic. used had been very recently prepared and was of a very faintly brownish tint.

I obtained samples of glycerin. acid. gallic. from different pharmacies and treated them as follows:—To 4 drachms of each sample I added 4 ounces of distilled water, and exposed the mixture to a temperature of 32° F. Even after the lapse of two or three hours no crystallization had taken place. Repeating the experiment with various samples of glycerin. acid. gallic. which I had recently prepared from different samples of gallic acid, crystallization began almost immediately. All these samples were made with only just sufficient heat to dissolve the gallic acid by placing them in a water-bath. A portion of a freshly prepared sample of glycerin. acid. gallic. was heated to 340° F. for about 5 minutes. Bubbles of carbon dioxide were given off, and the gallic acid was evidently changing into pyrogallol. On using this overheated sample to make the mixture there was only a very slight separation of crystals even after exposure to a temperature of 20° F. This I account for by the partial change of the gallic acid into pyrogallol, which is freely soluble in water. I think it is probable that a change similar to that produced by overheating takes place in this preparation after long keeping, and that this accounts for the fact that separation of crystals only took place when freshly prepared samples were used. It is, of course, possible that too great heat was used in making some of the commercial samples I obtained.

I observe Squire states that in the case of glycerin. acid. gallic. part of the acid separates on cooling and remains undissolved. This, however, I cannot confirm. I have prepared various samples from different acids, and glycerin of B. P. specific gravity, using as low a heat as possible to effect solution, and even at a temperature below freezing no separation took place. It is, however, a saturated solution, and if made stronger the acid is sure to crystallize.—*Phar. Jour. and Trans.*, March 16, p. 755.

Lactic Acid in Diarrhœa.—Sézary and Aune (*Lyon Méd.*) have successfully used lactic acid against the diarrhœa of tuberculous patients, the stools be coming natural in a few days. They commenced with 2 gm. in a glassful of water, given frequently in small doses during 24 hours; if necessary the quantity is increased to 6 or 8 gm. a day, and a little chlorodyne may be added.

NOTES ON CASCARA SAGRADA.[1]

By H. D. Fuge.

The characters of the dried bark as described in the British Pharmacopœia are fairly characteristic, and enable it to be readily distinguished from the various substitutes which have of late tended to manifest themselves on the market; but since a recent bark possesses properties which have a tendency to produce vomiting and epigastric pain, it would seem advisable to add to the official directions that the bark should be kept for a definite period before being employed for purposes of pharmacy.

A curious fact may be mentioned in connection with the nomenclature of cascara sagrada and its preparations. The extracts are officially (in *Brit. Ph.*) described as extractum cascaræ sagradæ and extractum cascaræ sagradæ liquidum. No mention of the drug occurs, however, in what from popular use might be termed its natural position, *i. e.*, as cascara sagrada (the English and Latin terms being identical), but one has to turn to Rhamni Purshiani Cortex, there to find that the title cascara sagrada is given merely as a synonym; apparently the same element of uncertainty was present in arranging the position of the drug, as appears in the selection of menstrua for its exhaustion.

I. *Extractum Cascaræ Sagradæ.*—This is directed to be prepared by exhausting the bark in No. 40 powder with proof spirit, by a process of maceration and percolation, with subsequent evaporation of the percolate until of a suitable consistence.

The official sanction might well be given to the recovery of the greater part of the spirit by distillation.

Pills made with this extract have the disadvantage of "falling," which can only be remedied, so far as I am aware, by varnishing them.

II. *Extractum Cascaræ Liquidum.*—This is prepared by the repeated boiling of 16 ounces of the bark with distilled water until exhausted; the strained liquor so obtained being evaporated to 12 fluid ounces, 4 fluid ounces of rectified spirit added when cool, and the product filtered and made up to 16 fluid ounces by the addition of distilled water. The process of filtration requires considerable patience even on the small scale.

The solvents ordered in the preparation of these extracts differ, the one being spirituous the other aqueous. As doubts have been expressed as to the efficiency of water in effecting solution of the principles of cascara, I decided to try whether the bark was thoroughly exhausted in the preparation of the official liquid extract.

---

[1] Read before the School of Pharmacy Students' Association; reprinted from *Phar. Jour. and Transact.*, March 9th, p. 736.

A weighed quantity of the bark was treated as described in the Pharmacopœia until the last liquor was free from color and taste; the residual cascara was dried, then macerated and percolated with spirit. Upon evaporating the percolate a considerable amount of extractive matter remained, which upon being tested physiologically was found to possess the characteristic laxative properties of the drug.

With a view of finding a process for completely extracting the bark a number of formulæ were tried; the following has produced the best preparation in my hands[1]:—

Cascara sagrada in No. 40 powder	20 ounces.
Rectified spirit Distilled water	of each a sufficiency.

Mix together equal quantities of the spirit and water. With this menstruum moisten the bark, pack tightly in a percolator, pour on more of the liquid and allow it to macerate for forty-eight hours; then proceed to percolate, adding more of the menstruum as necessary, until exhaustion is complete; reserve the first fifteen fluid ounces; evaporate the remainder to the consistence of soft extract and dissolve in the reserved portion; finally make up to 20 fluid ounces by the further addition of the diluted spirit.

The chief objections to the employment of cascara sagrada is its unpleasant and intense bitterness. Two methods are employed to get over this difficulty:—

I. The addition of some agent calculated to mask the bitter taste of the liquid extract.

In the Conference Formulary we have two examples of this kind, viz., syrupus cascaræ sagradæ (1 part of liquid extract in 5), and elixir cascaræ sagradæ (2 parts liquid extract in 5); the latter deposits largely on keeping.

A preparation which does not precipitate on dilution, and, in my opinion, is less nauseous than the above, may be made by mixing equal proportions of the liquid extracts of cascara sagrada and liquorice, a few minims of spirit of chloroform being added to each dose.

III. *Tasteless Extracts*—The suggestion that an extract of cascara sagrada devoid of bitterness might be prepared by the indirect agency of magnesia was due to Grazer of San Francisco (*vide Pharm. Journ.*, vol. xv., p. 745).

---

[1] The National Formulary directs diluted alcohol as the menstruum.

(1) An extract prepared as directed by him was found to possess very little medicinal value.

(2) An extract prepared by adding magnesia to the powdered bark and proceeding as in the official liquid extract likewise gave very poor results.

(3) The modified formula as given by Mr. Wright at the meeting of the Conference was next tried.[1] This, I consider, yields a much better preparation both pharmaceutically and medicinally; doses about twice as large as are indicated in the case of the official liquid extract should be employed.

(4) An equally good preparation may be made in a less complicated manner by adding magnesia to a spirituous percolate of the bark, the excess being subsequently filtered out before evaporation is completed.

As a result of a number of physiological experiments, made with "tasteless extracts," prepared in accordance with most of the published formulæ, the following conclusion has been arrived at: "That although they possess some degree of medicinal activity, they in no case possess the full physiological value of the ordinary liquid extracts."

The precise nature of the action of the magnesia I have as yet been unable to ascertain. Upon evaporating a portion of the extract to dryness and incinerating, a considerable amount of magnesium oxide was left behind; from this it might be expected that the bitterness would be again developed on acidifying the extract. This, however, is not the case; nor does the residual magnesia separated during the preparation of a tasteless extract as above described become bitter on treating with a slight excess of dilute acid.

It is stated in the important paper on cascara sagrada by Meier and Webber (AMER. JOUR. PHAR., 1888, page 87), that the resins contained in the bark are not bitter; the fact that the resinous matter precipitated by the addition of acid to a tasteless extract is not bitter would point to this conclusion.

I have not, however, succeeded in obtaining a product free from bitterness by repeated precipitation of the resin from a strong alcoholic solution with water.

---

[1] Mix cascara sagrada, powder No. 40, 1 pound, magnesia, 2 ounces, and water, 1½ pints; macerate for 12 hours, dry, powder and with proof spirit prepare 16 fluidounces of fluid extract.

NOTES ON EGYPTIAN OPIUM AND SOME OTHER DRUGS OF THE CAIRO BAZAARS.[1]

By William Martindale.

During a recent visit to Egypt I was much interested, as everyone is who visits the place, by the picturesque appearance of the Cairo Bazaars, and, having made inquiry at a wholesale drug house, regarding the cultivation of Egyptian opium, Signor Bossi, the manager, kindly went with me through the native drug bazaar, and acted as an interpreter.

He said that opium was collected, and the poppy cultivated for its production, at Akmim (the ancient Panopolis), on the right bank of the Nile, about 320 miles above Cairo, and a little of inferior quality at Assiout (or Siout, the ancient Lycopolis) on the left bank, about 250 miles up. It was offered to them at times, but was not dealt in by his house, because it was so much inferior to Smyrna opium. It is used by the natives, and is sold in the bazaars to which he accompanied me.

The piece of Akmim opium which I bought is a hard flat cake, about four inches in diameter by one inch in thickness. It has the mark of a leaf adhering to it, and is rough and irregular in appearance.

The Assiout opium is in segments of a cake, much softer than the other and is very inferior and adulterated in quality. Mr. Salter has examined some of each, and finds the crude samples to contain as follows:—

Akmim opium, 7·24 per cent. of morphine.
Assiout " 0·6 " " " "

Owing to my limited time, and not having booked a passage beforehand, I was unable to proceed any distance up the Nile, else I should have visited Assiout, the terminus of the railway, at which passengers join the Nile steamers for the quick trips up to Luxor and Assouan. Akmim is nearly opposite to Sohag, one of the landing stations of the boats, about seventy miles above Assiout.

I exhibit two specimens of the Egyptian poppy capsules, showing the incisions from which opium has been obtained. I saw poppy heads, on stalks, tied in bundles of about a dozen, exposed for sale.

---

[1] Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, March 13; reprinted from Phar. Jour. and Trans., March 16, p. 743.

These were not incised, but had been freed from seeds, which are used separately as food.

Soap root is much used for cleaning silks and other fabrics. It is not collected in Egypt, but is principally imported from Syria, where, I was informed by Said Gawadd, a Syrian pharmacist, it grows abundantly. There appears to be more than one kind of it in use. One is said to be obtained from *Gypsophila Struthium*, and to contain saponin, but Mr. Holmes thinks, from the appearance of the starch, that the sample of root which I exhibit, is obtained from some leguminous plant. It is very mucilaginous, but appears to contain little saponin.

I noticed in one part of the bazaar, a row of deep narrow granite mortars fixed in front of the shop, and on one occasion two Arabs were powdering some soap root, with iron pestles a little more pointed than those in use with us, pounding alternately in the same mortar, like a couple of blacksmiths. An array of primitive sieves was seen in the interior.

I exhibit some roots, one end of which is made fibrous, to serve the purpose of a toothbrush. These are the roots of *Capparis Sodada*. They are used like the Jamaica chewsticks. They have a slightly salt and agreeable flavor.

I noticed that styrax bark, from *Liquidambar orientale*, was frequently exposed for sale; it is in small agglomerated pieces of a reddish-brown color, and is mentioned by Hanbury under the name of *Cortex Thymiamatis*. It has an agreeable odor, and is used for burning as a perfume. It is from this bark that the liquid styrax has been pressed.

From a dealer in perfumes I bought some incense sticks, which are about 4 to 6 inches in length and three-eights of an inch in diameter. The burning material is rolled around a fine wooden spill, like the wick of a candle. Their composition is similar to that of our fumigating pastilles, and apparently includes styrax and cascarilla barks. I also obtained from him some perfume tablets for burning, which he much prized. They are gilded, and contain much resin, probably mastiche, frankincense and styrax. He also supplied me with a little mastiche for burning, some cascarilla bark, and a resinous substance which he valued highly, it having been brought from Mecca. This, on comparison with a specimen in the Museum, proves to be Palembang benzoin.

The pods of *Acacia arabica*, of which I obtained a small specimen, contain a quantity of astringent matter, and are used for dyeing, striking a black color with iron.

Henna, the powdered leaves of a species of *Lawsonia*, is also largely exposed for sale, and the stained finger-nails of many of the women and children give evidence of its use.

The fruits of *Zygophyllum coccineum*, which have an aromatic odor and a bitterish acrid taste, are used, I was informed, as a remedy for ophthalmia, which, in various forms, is very prevalent among the natives. They are said to have been used by the old Arabian physicians, and Mr. Holmes finds that the leaves of *Zygophyllum simplex*, which has much smaller fruits, are also used by the Arabs in eye diseases.

I also show some large pods of *Albizzia Lebbek*. This is commonly known as an acacia, and is much cultivated about Cairo and Ismailia. If its roots have access to any moisture from irrigated soil, it grows to the height of 40 or 50 feet. It thrives in a climate where no rain falls, and where few other trees, except palms, grow to any height. There is an avenue of these trees all the way from Cairo to the Pyramids of Ghizeh, a distance of about 8 miles. This tree is said by Martius to yield a gum allied to gum senegal, but I did not see such an exudation on any of the trees I examined.

The seeds of *Arachis hypogœa*, known as *Pistache de terre*, ground nuts, beans of Soudan (*Soudani "foule"*), are hawked about most of the streets of Cairo, and are considered to possess aphrodisiac properties.

Signor Bossi informed me that little or no senna now passes through Cairo. It finds its way into European commerce principally through Tripoli, and the same remark applies itself to gum arabic, which finds its way principally from the Red Sea ports to Trieste.

In conclusion, I may mention that there appear to be no restrictions on the practice of pharmacy in Egypt. There is no pharmacist holding the English qualification in business in Cairo, but there are pharmacies in the hands of French, Germans, Greeks and Syrians, at most of which English is spoken.

10, *New Cavendish Street, W.*

Rhus aromatica has been found useful in incontinence of urine in children as well as in old people. Dr. Max employed the tincture of the bark, of which he gave from 20 to 50 drops daily.—*L' Union Méd.*

THE ALKALOIDS OF THE ARECA NUT AND THE PHYSIOLOGICAL ACTION OF ARECOLINE.

The "areca nut" or "betel-nut," the seed of the areca palm (*Areca Catechu*), originally indigenous in the Sunda Islands, but now cultivated extensively in the warmer parts of India as well as in the Philippines, has become there an important commercial article. In the east, as is known, it is used as a masticatory together with lime and leaves of the betel pepper, and according to von Bibra the betel chewers number 100,000,000. The areca nut is also occasionally used in China and India as a vermifuge, and successful results in this respect have procured its introduction into the materia medica of European countries, it being sometimes used in Germany, for instance, as a remedy against tapeworm.

Up to the present it has not been known to which of the constituents the areca nut owes its extensive use among the Malays as an article of food, or upon which constituent its action as a vermifuge depends. The nut contains about 15 per cent. of tannin substance, 14 per cent. of fat coloring matter, etc.,[1] and, in addition, according to Bombelon,[2] it contains a liquid volatile alkaloid, the properties and composition of which, however, he had not described. As it seemed probable that the physiologically active constituent was to be looked for in this alkaloid, Mr. E. Jahns was induced to investigate the subject more closely, and has reported the results recently to the German Chemical Society.[3]

In the preparation of the areca bases two methods were adopted, which gave equally good results. According to one the powdered seeds were exhausted three times with cold water, to which strong sulphuric acid had been added in the proportion of two grams to each kilogram of the seeds; the pressed and filtered extracts were evaporated to about the weight of the raw material used, and after cooling and again filtering precipitated with potassium-bismuth iodide and sulphuric acid. An excess of the precipitant had to be avoided, since it exercises a solvent action on the separated double salt. The red crystalline precipitate was after some days filtered out, washed and decomposed by boiling with barium carbonate and water; the alkaloids went completely into solution, whilst bismuth oxyiodide, coloring matter, etc., remained undissolved. After filtration the alkaloidal solution was evaporated to a small volume, treated with sufficient caustic baryta, and shaken repeatedly with ether, which removed a base that has been named "arecoline," on account of its oil-like character. The residual liquid, which beside alkaloidal hydriodides, contained some barium iodide, was neutralized with sulphuric acid, and the alkaloids were set free by treatment successively with silver sulphate, caustic baryta and carbonic acid. The solution of the pure alkaloids was evaporated to dryness and the residue exhausted with cold absolute alcohol (or chloroform). "Arecaine" remained undissolved, whilst a third alkaloid, together with coloring matter, etc., went into solution, and upon evaporation of the alcohol remained as an amorphous mass.

---

[1] 'Pharmacographia,' 2nd. edit., p. 670.

[2] *Pharm. Journ.*, [3], xvi., 838.

[3] *Berichte*, xxi., 3404.

According to the second method the powdered areca nuts were exhausted cold with milk of lime, the filtered extracts neutralized with sulphuric acid and evaporated to a syrupy consistence. By dissolving in a little water and filtering, the gypsum and separated coloring matter were removed; the solution was then again concentrated, made alkaline, and the arecoline shaken out with ether. The other bases were then precipitated as before with potassium-bismuth iodide and sulphuric acid.

The yield of arecoline amounted to 0·07—or at most 0·1—per cent.; that of arecaine to 0·1 per cent. Only a very small quantity of the third alkaloid was obtained.

Arecoline ($C_8H_{13}NO_2$).—The arecoline was withdrawn from the ether solution obtained as described by shaking it with acidulated water, the neutralized liquid evaporated to a small volume and after adding sufficient potash solution again shaken out with ether. The base left upon evaporation of this solution was neutralized with hydrobromic acid, and the dried salt perfectly purified by repeated recrystallization from absolute alcohol. From this purified compound the free base and other salts of it were prepared.

Arecoline forms a colorless oily liquid of strongly alkaline reaction, which is soluble in all proportions in water, alcohol, ether and chloroform. It is volatile and can be distilled, the boiling point appearing to be about 220° C., though this could not be determined with certainty, on account of insufficiency of material. The salts are easily soluble, some of them deliquescent, but mostly crystallizable. It gives with potassium-bismuth iodide a pomegranate red precipitate, consisting of microscopic crystals (a delicate reaction), and with phosphomolybdic acid a white precipitate. Potassium-mercury iodide throws down from solutions not too dilute yellow oily drops, which after several days solidify and crystallize; solution of iodine throws down brown drops, and picric acid, a resinous precipitate that afterwards crystallizes in needles. Gold chloride also throws down oily drops, which, however, do not solidify. Platinic chloride, mercuric chloride, and tannic acid give no precipitate.

Arecoline hydrobromide ($C_8H_{13}NO_2 \cdot HBr$) crystallizes best of the simple salts. It is readily soluble in water, and in hot—but less freely in cold—alcohol; from an alcoholic solution it crystallizes in fine anhydrous prisms. The salt is permanent in air, not hygroscopic, and melts at 167° to 168° C.

Arecoline hydrochlorate crystallizes from a syrupy solution in fine needles, which deliquesce upon exposure to air. It is freely soluble in alcohol, as well as in ether-alcohol. It behaves similarly to sulphate, acetate, and nitrate.

Arecoline platinochloride ($(C_8H_{13}NO_2HCl)_2 \cdot PlCl_4$) is precipitated in glutinous flocks upon the addition of ether to mixed alcoholic solutions of arecoline hydrochloride and platinic chloride. After being washed with ether-alcohol and dissolved in water, it crystallizes from this solution upon standing over sulphuric acid in handsome well-formed rhombic orange-red anhydrous crystals, melting with frothing at 176° C. With cadmium chloride arecoline hydrochloride appears to form several crystalline double salts, readily soluble in water and difficultly soluble in alcohol.

Without doubt, arecoline is the physiologically active constituent of the areca nut, and the one upon which its action against tapeworm is dependent. It appears in this respect, as well as in its composition and properties, to stand near to pelletierine, one of the alkaloids of pomegranate root bark, which is also liquid and volatile, and has a composition, according to Tanret, corresponding to the formula $C_8H_{15}NO$.

Arecaine ($C_7H_{11}NO_2 \cdot H_2O$), purified by repeated crystallizations from 60 per cent. alcohol, forms colorless crystals, permanent in the air, freely soluble in water and in dilute alcohol, less soluble in stronger and nearly insoluble in absolute alcohol, by which it is dehydrated. It is also insoluble in ether, chloroform and benzol. The aqueous solution is neutral in reaction and has a slightly perceptible weak saline taste. At 100° C., arecaine loses its water of crystallization, melts with frothing at 213° C., and carbonizes when more strongly heated. In a solution acidulated with sulphuric acid potassium-bismuth iodide produces an amorphous red precipitate that very quickly becomes crystalline. Potassium-mercury iodide is far less delicate; it does not precipitate the (neutral) solution of the free alkaloid, but if this be acidified the double salt separates in yellow needles, or at first as an oily precipitate that quickly crystallizes. Potassium iodide also fails to affect a neutral solution, but upon acid being added dark-colored needles separate. Phosphomolybdic acid, as well as tannic acid, give a slight turbidity; picric acid gives no precipitate, and gold chloride and platinic chloride precipitate crystalline double salts from solutions that are not too dilute.

Arecaine combines with acids to form crystalline salts, having an acid reaction, freely soluble in water and less soluble in alcohol.

In respect to its properties arecaine comes near to trigonelline (methylnicotinic acid), from fænugreek, and probably resembles it in being a betaine-like body. Further experiments in this direction could not, however, be carried out for want of material. Like betaine, arecaine has proved inert in experiments upon animals.

The third areca alkaloid mentioned could not be closely examined, since the small quantity at disposal was not sufficient for the preparation of the pure compound. It was amorphous, easily soluble in water, alcohol and chloroform, difficultly soluble in ether, and had a strongly alkaline reaction. The platinum double salt crystallized in flat prisms or tables.

PHYSIOLOGICAL ACTION OF ARECOLINE.

The investigation of the physiological action of arecoline has been carried out by Dr. Marmé of Göttingen,[1] who used for this purpose the hydrobromide and the hydrochloride, of which subcutaneous or intravenous injections were made, or sometimes the solution was applied to the conjunction of the eye. It was found that full-grown rabbits died within a few minutes after the subcutaneous injection of 25 to 50 milligrams, but recovered after 10 milligrams. Cats succumbed after administration similarly of 10 to 20 milligrams; only the course of the poisoning was somewhat more prolonged. Dogs, even small animals of five to six kilograms body-weight, although strongly poisoned by the subcutaneous injection of 50 to 75 milligrams were not always killed.

---

[1] *Pharmaceutische Zeitung*, February 9, p. 97.

The symptoms of poisoning which were observed corresponded in many respects with those seen by Schmiedeberg in his investigation of muscarine, and further, when lethal doses were not used, they could be neutralized by means of atropine sulphate; eventually however they presented characteristic differences. The most dangerous action of arecoline consists in the slowing of the heart's action by small doses, or even its stoppage, just as takes place with muscarine; but the latter works in smaller doses, and it is only after somewhat larger doses of arecoline that the ventricle of the frog stops in diastole or is so influenced that the ventricle is not emptied and only after long intervals makes a weak undulatory muscular contraction. Subsequent injection of atropine removes this action upon the heart. Simultaneously with the heart's action the respiration is also affected. Small doses cause a considerable increase in the number of inspirations; larger doses cause a slower action with intensified expiration; and very large doses rapidly stop the breathing, especially in cats. After intravenous injection of a lethal dose the respiration usually ceases before the action of the heart.

The subcutaneous injection of 50 to 70 milligrams of arecoline salt into dogs of four to five kilograms body-weight, besides strong irritation of the heart, gives rise to tetanic cramps, which quickly give place to a partial paralysis. As a rule, however, the animals overcome the effects of such doses, the heart resuming its action completely as the effects pass off, but it becomes again affected through vomiting and liquid evacuations in which sometimes also worms are brought away. An increased peristaltic action of the bowels is, however, provoked in rabbits, dogs and cats, by much smaller doses.

Intense poisoning of dogs, rabbits and cats with arecoline may also be accompanied with so strong a contraction of the pupils of both eyes, that in dogs and rabbits they do not show larger than the head of a good-sized pin, whilst in cats they are reduced to a mere streak. Instillation of arecoline solution in an eye gives rise also to a strong one-sided narrowing of the pupil, but the quantity required is so large that the production of myosis in one eye may induce a flow of saliva in rabbits, and affect the heart and respiration in cats. For this reason the action of arecoline upon the human iris has not yet been tested.

Arecoline separates unaltered with the secretions and excretions, from which it can be recovered. In the absence of a characteristic color reaction, arecoline separated from urine can only be identified chemically by its behaviour with potassium-bismuth iodide, and physiologically by its action upon the heart of a curarized frog.

It has been stated by various authorities that the chewing of the areca nut gives rise sometimes to poisonous symptoms. As the natives of India and the neighboring islands chew principally the juicy kernels of the younger areca nuts with some quicklime and a leaf of *Piper Betel*, or older nuts that have been submitted to a preliminary treatment with hot water, it can be understood that these morsels contain little of the easily soluble arecoline, and that therefore it is only seldom that poisonous symptoms are observed, and then as a rule not in natives. But it is also in accord with observations made during the experiments on animals that the organism may become gradually tolerant to the poison of areca nut, as in the case of the smoking and chewing of tobacco.

In the opinion of Dr. Marmé the physiological experiments indicate that the areca nut may prove a valuable article of the materia medica, since there can be no doubt that arecoline hydrobromide is capable of being utilized therapeutically on account of its effect on the peristaltic action of the bowels, and on entozoa, and also in suitable combination as a cardiac remedy.—*Phar. Jour. and Trans.*, Feb. 23, p. 667.

COTTON-SEED OIL AND BEEF FAT IN LARD.[1]

By J. A. Wilson.

Up to some time ago, the positive detection, not to say the approximate determination, of cotton-seed oil and beef fat in lards was of a difficult character, but the discovery of certain optical and general tests has rendered this problem tolerably easy. Some time ago the author had reason to examine two samples of old cotton-seed oil, which had been in the laboratory thirteen and seventeen months respectively, and although the samples responded clearly to the general tests, on applying the silver test in the different forms prescribed, no reduction occurred alone or when mixed with genuine lard. Here then we have a serious objection to these silver tests, for the matter causing reduction of silver nitrate seems to be destroyed by keeping; hence a reaction with silver nitrate proves the presence of cotton oil, but no reaction does not prove the absence in lard.

---

[1] From *Chemical News*, March 1, p. 99. See also Amer. Jour. Phar., 1888, p. 573–578.

Chemists having old samples of oil in their possession will render service by trying the silver nitrate reaction on the oils. It is to be remarked here that I tried the reaction on the fatty acids produced by saponification, with a negative result. By acting on the oil by sulphur chloride, small percentages of cotton oil can be detected.

Researches on this subject have been published by Mr. Warren. Some time ago the author made some experiments on the surface tension tests for oils. Pure dry melted lard, dropped on water of 100° F., does not extend or increase in size. Beef fat or mutton fat extends over the surface of the basin, breaking up into innumerable droplets, and is agitated by a rapid gyratory motion.

The author mixed pure lard with 10, 15, 20 and 25 per cent. of beef fat, and allowed one drop to fall on water of 100° F. By noticing the degree of expansion and the time required, approximate determinations of the beef fat can be obtained. Mutton fat behaves similarly, and therefore cannot be distinguished. On repeating this with exactly the same lard eight months after, the drop behaved exactly like beef or mutton fat, this being most unfortunate. The only other test is the delicate test with iodo-mercuric chloride of Hubl. This method is one of the most delicate and best in the chemistry of oils and fats. The author's experience is most extensive, its results are exact and reliable. Somewhat discrepant statements exist, however, as to the iodinic absorption of cotton-seed oil and lard. Thus Pattinson (*Journal Society Chem. Industry*, No. 1, vol. viii.) gives from 57 to 63 per cent. iodine absorbed by lard, and 105 to 116 per cent. for cotton oil. The author has never found more than 60 per cent. for lard and 110 per cent. for cotton-seed oil. Again, Pattinson gives 41 per cent. for beef fat, whilst my figures approach the average, 44 per cent. It is needless to say these different statements would cause grave errors in calculating the foreign fat in a sample of lard. It would be of great service if chemists would state their experience of this most excellent test. In my opinion no satisfactory statement of the amount of beef fat or stearin can be given in lard containing cotton-seed oil. The following table gives the maximum and minimum absorptions of iodine in the common oils I have found :

Name of Oil or Fat.	Maximum Absorption. Per cent.	Minimum Absorption. Per cent.
Cotton-seed Oil	110·11	106·0
Linseed "	149·10	148·07
Rape Oil (Stettin)	102·76	100·43
Castor Oil	83·40	......
Palm "	52·40	51·01
Olive "	84·00	78·50
Neatsfoot Oil	70·70	70·00
Cocoanut "	9·35	8·97
Lard	60·00	57·10
Beef Fat	44·00	43·26
Mutton Fat	46·19	45·18
Bone "	49·58	46·27
Tallow	41·98	40·01

—*The Laboratory, Tottington Mill, near Bury.*

SYNTHETICAL PROCESSES IN THE ANIMAL ORGANISM.[1]

By E. Pflüger.

A living liver free from glycogen will again form that substance, not only from carbohydrates, but from glycerol, gelatin, or proteid. v. Mering fed dogs on phloridzin, whereby they became diabetic, and in a few days all carbohydrate material in the body had been discharged in the urine as sugar. If now the same drug was given to the same animals after a few days' interval, during which they had no food, they once more became intensely diabetic, and the quantity of sugar passed was so enormous that it cannot be supposed to have come from the drug itself (*Verhandl. des VI. Congr. inner. Med. Wiesbaden*, 1887). One explanation of the way in which glycogen is formed after the administration of glycerol, is the well-known "economy theory;" another is that glycerol and like substances act as stimuli to liver activity. It certainly cannot be supposed that glycogen is directly formed from the substance administered—or at least not in all cases; for instance, from ammonium carbonate. The question then arises as to the genetic relationship existing between glycogen and albumin.

---

[1] *Pflüger's Archiv*, xlii. 144–154; abstract from the *Jour. Chem. Soc.*, 1889, p. 174.

Experiments on the decomposition products of proteïds have in no case yielded a carbohydrate; and not only that, but proteïds never yield any of the decomposition products of carbohydrates (lactic acid, mucic acid, tartaric acid, etc.). Still, we have the formation of glycogen taking place in the liver when no food but albuminous food is taken.

The following general considerations will, however, lead to a better understanding of the subject. The chemical differences between animal and vegetable cells are not so great as was at one time supposed. Their chemical composition, so far as it is known, is the same; all living cells breathe oxygen, and produce carbonic anhydride, water and amido-compounds. If the synthetic processes are more highly developed in chlorophyll-holding plants, that does not mean that synthetic processes are absent from the animal cells. As instances of synthetic processes in animal cells, the formation of hippuric acid from glycocine and benzoic acid, or of ethereal hydrogen sulphates from phenol and sulphuric acid, may be taken. A special kind of synthesis must, moreover, occur in the retrogressive metamorphoses of proteïds which lead to the formation of uric acid and members of the same group. In albumin itself, and in the products of albumin obtained outside the body, the number of carbon atoms is much greater than that of nitrogen-atoms (indol, leucine, tyrosine, etc.); but in these products of metamorphoses in the body, the nitrogen and carbon atoms are nearly equal in number, or, as in the cases of urea and guanidine, the nitrogen-atoms are the more numerous. The importance of such synthesis occurring in living cells, resulting in the formation of cyanogen containing molecules, has been before insisted on by the author.

Researches on the formation of fat within the body show that here again there are undoubtedly syntheses occurring as the result of the activity of living cells; in fact, reactions occur which cannot be repeated in the laboratory or explained by any known chemical laws; they are, probably, therefore, the result of a breaking down of molecules in the first place, and the living cells then building up entirely new materials of a complicated nature from the simple carbon compounds so liberated.

The carbohydrates, for example, are derivatives of the hexatomic alcohol $C_6H_8(OH)_6$. But by feeding an animal on starch, the fat of the body is increased, and substances containing chains of 16 to 18 atoms of carbon linked one to another are formed; and in the case of stearic acid, at least, we have a number (16) which is not a multiple of 6. By this synthesis, too, we have substances which possess the property of circular polarization changed into those which are optically inactive. The first change must, however, be a process of reduction; metabolic changes must occur, and no nutrient material stimulates metabolism like proteïd; this explains why feeding on starch mixed with a small amount of proteïd produces fat, and without it will not. The proteid mixture is, however, so small that it alone will not explain the great increase in fat. In other parts of the animal kingdom there are similar occurrences; for instance, the formation of beeswax from honey. Another sample of the same kind is the formation of fat from proteïd, although this is not so well proved as the foregoing cases. In the synthesis of fat from carbohydrate, the group $CH{\cdot}OH$ must be changed into CH_2; and in the formation of carbohydrate (glycogen) from proteïd, the group CH_2 must be changed into $CH{\cdot}OH$; in both cases, numbers of these groups become linked together.

The close resemblance between animal and vegetable cells is further shown by the fact that many lower plants (bacteria, moulds, etc.), not only flourish in solutions of albumin and sugar, but actually shed out ferments to convert porteïd into peptone, and starch into sugar, and thus aid absorption. They breathe oxygen, produce carbonic anhydride, amido-derivatives, and, without the aid of sunlight, fat, carbohydrate and proteïd. Nägeli (*Sitzber. Bair. Akad. Wissensch.*, 1879) has, however, shown that these fungi will assimilate carbon from compounds in which it is combined with hydrogen (amines, etc.), but not from those where it is combined with nitrogen (cyanogen).

PHOTOGRAPHY.

By F. V. Butterfield.

(*Concluded from page* 158.)

This paper would be still incomplete without a slight reference to a few of the many useful applications to which photography has been already applied. Besides its extended use in portraiture, it has rendered invaluable service in astronomy, and paradoxical as it may seem, nebulæ, etc., have been photographed whose existence was utterly unknown, being invisible through the most powerful telescopes, until still larger were recently constructed, when, on a careful examination of that portion of the heavens indicated, the evidence of the sensitive photographic plate was fully borne out. This is accounted for, however, by supposing that the light emitted by these nebulæ is extremely rich in chemical or actinic rays.

A grand international scheme has just been concluded with the object of a true stellar map of the entire universe. To this end photographic apparatus has been set up in the different observatories throughout the world.

By the Act of Parliament of 1871 for the prevention of crime, all criminals were ordered to be photographed during their incarceration. Some of them occasionally object to the process, and amusing incidents are related of the various "dodges" employed by the operators in securing negatives of the refractory and unwilling sitters.

In military operations its importance has not been overlooked, and a regular staff of photographers is kept at Shoeburyness.

In conjunction with the microscope, or photomicrography, good results have also been obtained, and it is even stated that "sharp" microphotographs have been secured of the ever changing amœba.

But one great problem still remains unsolved. I refer to photography in natural colors, or heliochromy. Many great workers have attempted to discover some method or means of attaining this, but hitherto it has eluded their grasp.

As the advent of photography dealt a death blow to the miniature portrait painting, which was so much in vogue at the time, it is almost certain that this branch, if ever brought to perfection, will finish the work the other begun, as the pictures so produced would be true to nature in all her beauty and perfect in every detail, and the different schools of landscape painters would sink into nothingness before the faithful reproductions of nature herself.

In attempting to treat a subject of such vast extent as photography in a short paper like this, much interesting detail has of necessity been omitted, and many very recent improvements perforce excluded. As stated at the commencement, the object throughout has been to confine the matter chiefly to the requirements of the beginner, enabling him to add another charm to his existence, to fully realize that a thing of beauty is a joy for ever, to redouble the pleasure of his annual holidays and keep them ever green by bringing back true representations of the most striking views and beauty spots encountered during his tour, or the features of friends far distant, whom he may have visited. At the same time, as much attention as possible has been given to the science of the subject, and throughout I have given those processes only which have always answered well in my own hands, and which I strongly advise the intending beginner to thoroughly master before trying any of the many new suggestions.

Potassium chloro-platinate and the salts of ferric oxalate are now being largely used in the different methods of platinum printing, which seems to be rapidly growing in favor. For comparison, I have here two specimens of this process; one, on the ordinary platinotype; the other, on Pizzighelli's platina paper, so that you may judge for yourselves.

A great deal of attention is being paid at the present time to orthochromatic photography, and already some are beginning to use these plates entirely, instead of the ordinary gelatine dry plate. As previously stated, the sensitive films are stained with some dye in this process, and experiments are still being made to discover the one best suited for the purpose. Chlorophyll, cyanine and eosine have been largely used. It appears that cyanine blue makes the plate more sensitive to yellow or orange rays, whilst eosine absorbs in the green or green yellow; but pure red rays, as in the case of the ordinary plate, have little or no effect on plates prepared with either of them.

MINUTE OF THE COLLEGE MEETING.

The annual meeting of the members of the college was held this day in the College Hall, Charles Bullock presiding, eighteen members being present. The minute of the last stated meeting was read and, on motion, adopted. The minutes of the Board of Trustees for the months of January, February and March were presented and, by resolution, approved. Professor Maisch referred to the fact of a chart having been prepared, and with photographs of the college buildings and the text-books used, sent to the exhibition at Paris, illustrating the methods and results of the educational system of this college, and moved that the same be presented to the library of the Ecole de Pharmacie, Paris. Professor Remington moved that the gift be bestowed on behalf of the college through Mr. Jules A. Creuse, of 109 Boulevard San Michel, Paris. The resolutions were adopted, and the Secretary was directed to communicate with Mr. Creuse.

The Publication Committee reported the prompt and regular issue of the JOURNAL during the year past. The reports of the Business Editor and of the Treasurer of the Committee were also submitted, giving the financial statement and the balance.

The Editor of the JOURNAL submitted his report as follows:

TO THE PHILADELPHIA COLLEGE OF PHARMACY:

The editor respectfully reports that during the past year seventy original papers were published in the Journal, of which number twenty-eight were contributed by eight members of the College, and nineteen papers by fourteen authors who are not members. The remaining papers consisted of more or less extended abstracts of fifty-three theses of last year's graduating class. Twenty-four of the papers, a portion of them contributions from the College laboratory, were read at meetings of the College. In addition to the papers mentioned, each number of the Journal contained original translations, abstracts from European journals, also editorials, reviews, and other matter, prepared by the editor, besides the essays republished from other journals. While the number of papers read before the College was smaller than during the preceding year, they were of considerable interest, and contributed much to the usefulness of these meetings.

Respectfully submitted,
JOHN M. MAISCH,
Editor.

MARCH 25, 1889.

The Librarian presented his annual statement, giving a detailed list of the volumes added to the library. The report includes the statement that "there is now completed in our library some of the most valuable works of reference known to English, German and French readers."

The Curator offered the following statement:

MONDAY, MARCH 25, 1889.

TO THE MEMBERS OF THE PHILADELPHIA COLLEGE OF PHARMACY:

Gentlemen:—Your Curator would respectfully report, that the Museum is in excellent condition and has received, during the past year, a number of valuable accessions; notably a collection of botanical specimens prepared by Mr. E. M. Holmes, Curator of the Pharmaceutical Society of Great Britain, through Mr. Charles Bullock, of this city; a fine assortment of powdered extracts from Hance Bros. & White; a collection of pure spices, whole and ground, from Robert Shoemaker & Co.; an assortment of rare sponges from Wm. B. Burk & Co., and recently, at the Alumni Exhibition, an excellent display of some 30 assayed drugs, from Messrs. Gilpin and Langdon, of Baltimore.

Respectfully submitted,
JOSEPH W. ENGLAND.

The Committee on Deceased Members, through Mr. Procter, offered the following memoir of the late Claudius B. Linn, a graduate of this college, class of 1838.

Claudius B. Linn, a graduate of this college, Class of 1838, deceased in this city on the 6th inst., in the 73d year of his age.

Mr. Linn learned the drug business in the store of Henry Troth, and entered into the wholesale business under the firm name of Linn, Smith & Co., located on Market street, between 5th and 6th streets, north side.

In 1853 the firm retired from business, and Mr. Linn continued his connection with the drug trade as a commission merchant.

Mr. Linn took an active interest in the establishing of the Philadelphia Drug Exchange, and was an ex-President of that body.

The general disposition and integrity of character of Mr. Linn was recognized and appreciated by all of his friends and business acquaintances. The wholesale trade will regret the taking away of one who was always a welcome caller in their counting-rooms, and his personal friends will cherish the remembrance of his Christian and gentlemanly character.

Mr. Charles Bullock, of the committee, referring to the efforts to collect facts in the personal history and connection of the late Dillwyn Parrish with this college, stated that the members of the family had been applied to for some details but had not as yet responded. The facts that the deceased had long honored this college by presiding faithfully over its councils as its revered President, of his interest and labors in promoting its welfare, of the respect and influence which his connection inspired, constitute a valuable memento in the archives of this institution.

This occasion being the period of election of officers, the following names were placed in nomination: For President, Chas. Bullock: 1st Vice-President, Robt. Shoemaker; 2nd Vice-President, Wm. J. Jenks; Treasurer, William B. Webb; Correspondieg Secretary, Dr. A. W. Miller; Recording Secretary, W. B. Thompson; Librarian, Thos. S. Wiegand; Curator, Jos. W. England; Publication Committee: Henry N. Rittenhouse, Jas. T. Shinn, Chas. Bullock, Thos. S. Wiegand, John M. Maisch, Editor; Editor, John M. Maisch. The terms of the follwing trustees expiring with this date, John M. Maisch, Sam'l P. Sadtler and Robert England, these gentlemen were renominated. There being no opposing candidates to any of the foregoing nominees, it was on motion resolved that Mr. Chas. A. Heinitsh, of Lancaster, deposit an affirmative ballot, which being done, they were thereupon declared duly elected. It having been stated that Mr. S. S. Bunting, the Treasurer of the College, desired by reason of impaired health and serious threatening illness, to be relieved of a continuance in his position, a very general expression of feelings of sympathy and of regret of the loss to the College of his long-continued and faithful service as an officer, was offered by the members. The Secretary was directed to transmit to Mr. Bunting a minute of this, and to place an acknowledgement of his valued connection upon the record of the College.

Mr. William McIntyre referred to the successful character of the recent exhibit given in the College Hall illustrative of the progress of pharmacy, made under the auspices of the Alumni Association. Mr. Robert England moved a vote of thanks to the members of the Association for their labors in this behalf, which was adopted.

A motion to elect delegates to the Session of the American Pharmaceutical Association to be held at San Francisco in June next, as well as to that of the Pennsylvania Pharmaceutical Association convening at Scranton in June, resulted in the following:

To the American Association, Charles A. Heinitsh, Joseph P. Remington, Charles Bullock, John M. Maisch.

To the Pennsylvania Pharmaceutical Association, William McIntyre, E. C. Jones, Gustavus Pile, Alonzo Robbins, Wallace Procter.

For the unexpired term of William B. Webb, Trustee (now Treasurer), Samuel S. Bunting was unanimously elected.

On motion the President was directed to appoint three delegates to the Convention to revise the United States Pharmacopœia to be held in Washington in May, 1890.

On motion, adjourned.

WILLIAM B. THOMPSON,
Secretary.

PHILADELPHIA, March 25, 1889.

Oleoresin of Aspidium has been given by Dr. J. O. De Man (*Ther. Mon.*, January, 1889), in doses ranging from 2 to 9 drachms, the average being from 5 to 6 drachms. It was given in capsules in 28 cases, repetition of the dose being necessary in three cases only, because the first dose was vomited. The tapeworm was expelled in two or three hours.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, March 22d, 1889.

The meeting was called to order, and, on motion, Mr. McIntyre was called to the chair.

The Secretary called attention to a specimen of *carbonate of ammonia* of American manufacture; it is made at Detroit, and is now largely displacing the English made article; it is packed in strong barrels and keeps well; it ordinarily sells at a slightly lower price, but has a peculiar slight odor, recalling that of stale urine.

The J. B. Lippincott Co. presented to the library a handsome special index copy of the sixteenth edition of the United States Dispensatory bound in sheep, and the Committee of Revision of the Pharmacopœia a copy of Part I of the Digest of the Criticisms of the United States Pharmacopœia of 1880. The thanks of the College were ordered to be returned for the works presented. The last volume of the Encyclopædia Britannica was also laid before the meeting. It is stated by the publishers that a supplementary volume will be issued in a year or two.

Albert P. Brown, Ph. G., read a paper upon *Oleate of Mercury*, and stated that the result of the process detailed was preferable to that of the officinal process; several samples of the oleate made by processes of double decomposition were exhibited. Mr. Beringer thought that Mr. Brown's process was a step in the right direction, and the nearer we came to definite chemical compounds the better. He thought that a better process was to make a true sodium oleate from soda and oleic acid, and then decompose it with mercuric chloride. Using zinc sulphate an excellent oleate of zinc could be obtained by the same process.

Professor Maisch exhibited a specimen of a drug sent to him by Mr. Wm. B. Addington, Ph. G., of St. Louis; it is known in Mexico as *jamaica*. Examination shows it to consist of the calyses of *Hibiscus Sabdariffa*. It is a refrigerant and contains, according to Dymock's Drugs of India, beside watery extractive, cellulose, and ash, tartaric acid 9·9 and free malic acid 15·54 per cent.; these figures seem to be too high, as its taste would be much more acid if it contained such a large proportion of free acids.

Mr. Beringer showed a specimen of a yellow bark imported into New York from South America, but no further history of it could be obtained as the consignee has died; it has an extremely bitter taste.

A paper on *Adulterated Flaxseed Meal* was read by Mr. Beringer.

There was some discussion about the advisability of adding to the definition of the Pharmacopœia a test for the absence of starch, and of increasing the minimum percentage of oil from 25 to 30, which would prevent the addition to flaxseed meal of a limited amount of cake meal, considered necessary by some for the longer preservation of the oil.

Mr. Meyer referred to the cleansing of mortars used for acrid substances such as piperine, etc.; he thought it was a matter of sufficient importance to claim close attention; powders mixed in a mortar that had been previously used for an acrid substance may be so changed in taste as to alarm customers and make them suppose a mistake had been made; digesting acids in the mortars had been tried, but even that had failed to remedy the trouble. To prevent such annoyance it was recommended to have certain mortars that should be used only for acrid powders. On motion adjourned.

T. S. Wiegand,
Registrar.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

Philadelphia College of Pharmacy.—The examinations of the *junior students* were held November 10th, December 8th, and February 14th, the questions in the different branches being as follows:

BOTANY AND MATERIA MEDICA.

1.—What is a root? How does it grow in length? What are adventitious roots? Give some account of biennial roots. Name one or more perennial herbs, and state which part of these plants is perennial, and from which part the overground stems grow.

2.—Define parenchyma, and illustrate by drawings some of its different forms. What are stone cells? Give an example. What is cork, and where is it formed? How are ducts formed; how are they marked, and with what other cells are they usually associated?

3.—What is a leaf? Describe, commencing with the upper surface, the different tissues of a leaf, giving for each tissue the kinds of cells and their arrangement. What other plant organs are leaves in a modified form? Describe briefly for each of these organs the nature of the modification.

4.—Explain by description and sketches the arrangement of fibrovascular tissue, both for monocotyledons and dicotyledons, in the root; in the stem, and in the leaf.

5.—Give the botanical characters of the order of *Labiatæ.* Name the plants yielding *Peppermint* and *Spearmint.* By what characters may the two plants be distinguished? From which of these two plants and in what manner is *menthol* obtained?

6.—Name one or more officinal drugs obtained from each of the following orders: Geraniaceæ, Umbelliferæ, Loganiaceæ, Solanaceæ. Which of the drugs named by you contain poisonous alkaloids?

THEORY AND PRACTICE OF PHARMACY.

1.—Describe the Metric System. What are the units? How were they derived? Why is it sometimes called the Decimal System? What prefixes are used to express the multiplication or division of the units? What advantages does the system possess over all others? What are its disadvantages?

2.—State and illustrate the different principles which govern the evaporation of liquids at or above the boiling point, and below the boiling point. What is the proper shape for vessels to be used for evaporation below the boiling point?

3.—Write out a description of a good hand-power drug mill, suitable for the needs of a pharmacist. Illustrate the various parts by drawing such simple sketches as you deem necessary to explain the action of the mill.

4.—What is meant by circulatory solution? Give the reasons why a solid substance should be agitated in contact with a solvent, if rapidity of solution is desired?

5.—Describe briefly the various processes that a drug like a Medicinal Root should undergo, from the time it is taken from the earth until it is made into a liquid extract?

6.—How many strengths of Water of Ammonia are officinal? Describe a process for making Water of Ammonia? What is the commercial name of the Water of Ammonia found in the market, which differs in strength from either of the officinal kinds? What precautions are necessary in handling stronger Water of Ammonia?

CHEMISTRY.

1.—How do we measure changes of temperature most accurately? What are the two scales now officinal in the U. S. Pharmacopœia? Convert 98° F. into C. degrees, 15° F. into C. degrees, and 79° C. into F. degrees.

2.—What is the composition of white light? State how this composition of light can be ascertained. What valuable method of chemical analysis has been based upon this property of light?

3.—Define an acid, a base, and a salt, and illustrate by an example of each. What is the difference between an acid salt, a neutral salt, and a basic salt? Give an example of each class. Give the correct chemical names for HI. $Ca(OH)_2$. KNO_3. $NaHCO_3$ and Na_2HPO_4.

4.—Write in chemical symbols two reactions for the manufacture of chlorine. State how a lighted taper burns in chlorine, and give the reason for its behavior. State the circumstances under which chlorine has a bleaching action, and explain this action.

5.—Complete the following reactions, and name the several substances used in the reactions, and the products obtained.

$NaNO_3+H_2SO_4=$
$Ca_3(PO_4)_2+2H_2SO_4=$
$CaCO_3+2HCl=$

6.—How is boric acid obtained? Describe *acidum boricum* and *sodii boras.* Give the chemical formulas for both of these compounds.

QUESTIONS BY THE EXAMINING COMMITTEE.

1.—How many cubic centimeters would 1000 grams of glycerin occupy if it is one and a quarter times as heavy as water? How many grains would a fluidounce of the same liquid weigh?

2.—How many grains of each of the ingredients will be needed to make one pound, avoirdupois, of a mercurial ointment, if it requires mercury 45 per cent., lard 20 per cent., suet 20 per cent., compound tincture of benzoin 5 per cent., mercurial ointment 10 per cent.

3.—Give the full English and popular synonyms of the following officinals Ceratum Resinæ, Hamamelis, Sambucus, Ichthyocolla, Mistura Magnesiæ et Asafœtidæ, Mistura Potassii Citratis, Pilulæ Aloes et Mastiches, Potassii et Sodii Tartras, Unguentum Hydrargyri Nitratis, Unguentum Aquæ Rosæ.

4.—Give the botanical name, natural order and habitat, of the plants which yield the following drugs. Specify the part used, and state the officinal title of each drug:—Levant Wormseed, Koosso, Red Rose, Sage.

5.—Illustrate by diagram each of the following forms of leaves:—Lanceolate, Ovate, Cordate, Peltate, Pinnate, Bipinnate. Write the name of each form just below its illustration.

SPECIMENS.

Santonica.
Sambucus.
Cetraria.
Anthemis.
Aqua anisi.
Spirit. Lavandulæ.
Extract. Gentianæ fl.
Sodii boras.
Sodii bicarbonas.
Acid. phosphoric.

The examinations at the close of the senior course occupied five days and were conducted as follows:

MATERIA MEDICA AND BOTANY.

A.—Belladonna root.—Give the botanical name of the plant, its natural order, and its habitat. Describe the drug, including its structural characteristics. Is the young root or the root from old plants preferable, and why? How may the trimmed root be distinguished from marshmallow root? What alkaloids are found in this drug, and what is the percentage of alkaloids? Give some characteristics of the principal alkaloid. State the medicinal effects of the alkaloid. Give the medicinal doses of the root and of the alkaloid.

B.—Menispermum.—Name the plant, its natural order, its habitat, and the part employed medicinally. Describe the drug; also its structure, and state in what respects this structure differs from that of the overground stem. Name the principal constituents of the drug, its medical properties, and state its dose.

C.—Guaiacum wood.—What is the name of the plant, its natural order, and its habitat? Which portion of the wood is used? Describe it, including the structure. What amount of resin does the wood yield? Give a color reaction of the resin, and state the effects of some solvents upon it. What impurities are found in the commercial resin? Give the dose of the resin.

D.—Acrid barks.—Name the officinal barks having a strongly acrid taste. State to what principles the acrid taste is due in each case. Describe the main characteristics—other than taste—by which these barks may be recognized or distinguished from one another.

E.—Savine.—Name the plant, its natural order, its habitat, and the part collected. Describe the drug, stating also the cause of certain differences in its appearance. Give the medical properties and dose of the drug. Describe the physical properties of its most important constituent, and give its chemical composition. Name principles of the same composition obtained from other plants of the same natural order, and state in each case from which part of the plant it is obtained.

F.—Umbelliferæ.—Give the botanical characters of the natural order relating to the fruit. Name the officinal fruits of this order. State the number of oil tubes found in each of these fruits, and give brief characteristics of the volatile oil of each. Which umbelliferous fruit is collected before ripe, and why?

G.—Seeds.—Name the pharmacopœial seeds, which are free from albumen (perisperm) and have a straight embryo. Give for each seed the medicinally important principle. State in which tissue of the seed each principle is contained; also, the percentage, and the principal characteristics of each of these principles.

H.—Lupulin.—Name the plant yielding lupulin, its natural order, and its habitat. State from what part of the plant lupulin is obtained, and how it is collected. Describe its physical appearance, its structure, and the effect of different simple solvents upon it. Which are its important medicinal principles, and how are these affected by exposure to the air?

I.—*Guarana.*—Give the botanical origin of the drug. State what part of the plant is used, and how it is prepared for the market? Describe the drug; and state the effect of simple solvents upon it. Name its principal constituents and their percentage. Give a process of assay for the alkaloid present. What other plants contain the same alkaloid?

K.—Adulterations.—Describe the processes, with the necessary details, for detecting the following: 1., Barium sulphate in cochineal; 2., Chalk in saffron; 3., Rosin in chinoidine; 4., Oil of sassafras in oil of gaultheria; 5., Corn starch in powdered tragacanth.

THEORY AND PRACTICE OF PHARMACY.

A.—1. A druggist was offered *forty pints of glycerin* (U. S. P.) valued at 40 *cents* per pound (Av.), in exchange for *twenty gallons* of *Stronger Water of Ammonia* valued at 12 *cents* per pound (Av.). How much would he gain or lose by the transaction?

2. If Syrup of Hydriodic Acid contains one per cent. by weight of Hydriodic acid (HI, molecular weight 127.6), and has the specific gravity of 1.300, how much iodine would be required theoretically to make one pint of Syrup?

B.—Give the unabbreviated officinal names, ingredients, brief outlines of process, and describe the appearance of Diluted Nitrate of Silver, Fluid Extract of Belladonna, Bitter Wine of Iron, Neutral Mixture, Extract of Colchicum Root, Griffith's Mixture, Tincture of Capsicum, and Compound Powder of Rhubarb.

C.—Give the English names, synonyms, ingredients, and describe the appearance of Mistura Ferri et Ammonii Acetatis, Pulvis Ipecacuanhæ et Opii, Ceratum, Syrupus Scillæ Compositus, Tinctura Cinchonæ Composita, Pilulæ Antimonii Compositæ, Emplastrum Ichthyocollæ, Spiritus Aetheris Compositus.

D.—Describe three methods for obtaining volatile oils, illustrate each by naming a volatile oil obtained by the particular process that you have described. Name three of the common adulterants of volatile oils, and state how each may be detected.

E.—Give the principal tests of identity for Santonin, the Aloins, Salicin, Strychnine, and Veratrine.

F.—Name three ferments obtained from animal substances, and describe the appearance of the ferments as they are found in commerce. State the special medical use of each.

G.—What is meant by the terms Chemical, Pharmaceutical and Therapeutical Incompatibility? Write out a prescription illustrating each.

H.—1. Write out a prescription for one pint of 50 per cent. emulsion of cod liver oil, and describe the best process for making it.

2. Write out a metric prescription for one hundred pills, each to contain $\frac{1}{50}$th of a grain of Strychnine with 3 grains of Iron by Hydrogen, and name the best excipient for the pill.

I.—What additions could be suggested for each of the following prescriptions, which would not interfere with their medicinal effect, and yet improve their appearance:

℞

Acid. Salicylic	ʒ ij.
Potass. Acetat	ʒ iij.
Syrupi,	
Aq. Destill	aa f℥ij

℞

Strychninæ	gr. j.
Ferri Pyrophosph	ʒ ij.
Acidi Phosph. Dil.	
Syr. Zingiber	aa f℥ij.

K.—Examine the following prescriptions, and if you would dispense them, state the proper method, explaining the difficulties, if any exist, and give the quantity of finished preparation in each case.

℞

Quin. Disulph	gr. x
Acid. Sulph. Dil	f ʒ j.
Infus. Ros. Comp	ad f ℥iv.

℞

Sodii Chlorid	ʒ ij
Potass. Chlor	ʒ iiss.
Acid. Hydrochlor	f ʒ iv.
Aquæ,	ad f ℥ iij.
M. Ft. guttæ s. a.	

CHEMISTRY.

A.—1.—Give the formulas of the several Phosphoric acids, of Phosphorous acid, of Hypophosphorous acid.

2.—Give the formula of a salt of each of these acids.

B.—1.—Enumerate the metals of the alkali group.

2.—How are they obtained in the free state?

3.—Give the chemical formulas of the officinal alkaline carbonates, nitrates, sulphates, and phosphates.

C.—1.—How is magnesium obtained?

2.—Describe the metal and state its distinctive characters.

3.—State how the "light" and the "heavy" carbonates of magnesium are obtained.

4.—Give the officinal names of the compounds obtained from these carbonates on ignition.

D.—1.—Describe the metal Zinc, stating fully its physical and chemical characters.

2.—What are the industrial uses of Zinc, its alloys and its compounds?

3.—What compounds are most important in their pharmaceutical uses?

4.—How do you distinguish Zinc from Aluminum in qualitative analysis?

E.—1.—From what sources and by what processes is metallic Silver chiefly obtained?

2.—What is the composition of the silver coinage alloy in general use?

3.—If *Argenti Nitras* is made from silver coin, how is it purified?

4.—What are the several officinal preparations of this salt?

F.—1.—What is the effect of oxidizing agents upon a primary alcohol?

2.—Illustrate this with a monatomic alcohol and with a diatomic alcohol, using as far as possible officinal compounds as examples.

3.—What is the difference between primary, secondary and tertiary alcohols?

G.—1.—Is there any chemical distinction between the fats and the waxes? Illustrate by formulas of each class.

2.—Write the reaction for the saponification of a fat by caustic alkali, by water, and by lime.

3.—Which are the most generally occurring fat acids?

H.—1.—Write the several reactions showing the derivation of aniline from benzene.

2.—How are these reactions carried out in practice?

3.—Write the structural formulas of the several derivatives referred to in your answer.

I.—1.—How would you define an alkaloid?

2.—By what reagents can alkaloids be detected?

3.—State the groups into which they are usually divided, and the differences upon which this grouping is based.

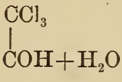
4.—What substances seem to be indicated as underlying the constitution of many of the alkaloids?

K.—Give both chemical and common names for the following compounds—

1.

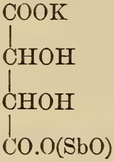
CHI_3

2.



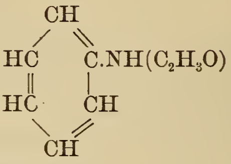
$$\begin{array}{l} \mathrm{CCl_3} \\ | \\ \mathrm{COH+H_2O} \end{array}$$

3.

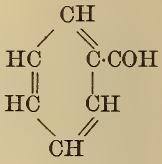


$$\begin{array}{l} \mathrm{COOK} \\ | \\ \mathrm{CHOH} \\ | \\ \mathrm{CHOH} \\ | \\ \mathrm{CO.O(SbO)} \end{array}$$

4.



5.



EXAMINING COMMITTEE.

A.—Opium.—1. Give the botanical name of the plant from which it is obtained. 2. How is opium prepared? 3. What Morphine strength is required by the Pharmacopœia for powdered opium? 4. Name all the officinal liquid preparations containing opium. 5. What percentage of opium is contained in each?

B.—1.—Name the officinal drugs obtained from the cotton plant.

2.—Name the officinal preparations into which they enter, directly or indirectly.

C.—1.—Describe three readily applied methods by which you could prove that your Sodium Bicarbonate receptacle had been carelessly filled with Sodium Borate.

2.—How is a mixture of fixed oil and water separated by filtration, if you desire to obtain the oil clear?

D.—How many grammes of strychnine will there be in two litres of Tincture of Nux Vomica, U. S. P., if its specific gravity is ·900, and the dry extract contains 8·8 per cent. of the alkaloid? Show all figures used in obtaining your answer.

E.—1.—Give the botanical names of five plants which owe their activity to alkaloids which are themselves officinal.

2.—Name these several alkaloids and any of their salts that may be officinal, together with the adult dose of each of the latter.

F.—1.—What is the officinal name of White Mustard?

2.—Give the natural order, habitat, and description of the plant yielding it.

3.—Is there any other variety of Mustard officinal? If so, what is it called?

4.—To what principle does White Mustard Seed owe its rubefacient properties? How is this principle developed?

5.—Name an officinal liquid derived from Mustard, and state from which variety it is obtained.

6.—Is whole Mustard Seed used internally? What are its medical properties?

G.—1.—Describe the officinal process for fluid extracts.

2.—Describe briefly the process of *repercolation*, and state what advantages it possesses over simple percolation.

3.—Why are different strengths of alcohol directed in the preparation of fluid extracts?

4.—Mention a fluid extract made with alcohol, and one with diluted alcohol, and give the reasons for their use in each case.

H.—1. How would you compound the following prescription? Would it make a good antiseptic lotion? Criticise.

℞

Potass. Permanganat.,	gr. xx
Glycerini	*f* ʒ ij
Tr. Opii	*f* ℥ ss
Aquæ	q. s. ft. *f* ℥ viij

M. Ft. "Antiseptic lotion."

Sig.—Use freely to avoid infection.

2. Copy the following prescription, writing out the names in full of the quantities, and state how you would prepare it?

℞

Tr. Ferri Chlor	12	5
Sol. Ammon. Carb.	60	
Sol. Acid. Acetic	60	
Morphinæ		245
Elixir. Simp	60	
Acid. Acetic	4	15

M. Ft. Mist. sec. art.

Sig. — Dessertspoonful every 4 hours.

I.—3. How should this prescription be prepared—

℞

Hydrarg. Chlor. Mit	gr. ij
Antim. et Potass. Tart.	gr. ss
Pulv. Ipecac. et Opii	ʒ ss
Tinct. Aconiti	gtt. xxiv
Tinct. Verat. Virid	gtt. xxiv
Sacch. Alb	ʒ j

M. et in chart. No. xii. divid.

Sig.—One to be taken every 3 hours.

4. Is this prescription safe? Give reasons for your conclusion.

℞

Acid. Arsenios	gr. iss
Hydrarg. Chlor. Corros	gr. iss
Strychninæ	gr. j
Morphinæ Sulph	gr ij
Ferri Reducti	gr. lxiv

Misce, ft. massa et in pilulæ. No. xxxii. divid.

Sig.—One to be taken 3 times a day.

K.—5. Describe the appearance of the following prescription. Criticise.

℞

Quininæ Sulph.	gr. xxxii
Acid. Sulph. Aromat	ʒ ss
Syr. Zingiber	*f* ℥ j
Aquæ	*f* ℥ ij
Tr. Ammon. Valerianat	*f* ℥ j

M. Sig.—A teaspoonful 4 times a day.

6. Should this prescription be dispensed? Give reasons for your conclusions.

℞

Acid. Arseniosi	gr. v
Pulv. Opii	gr. iv
Ext. Gentian	ʒ j

M. ft. mass et in pilul. No. xx. divid.

Sig.—One to be taken 3 times a day.

SPECIMENS.

Materia Medica.	*Pharmacy.*	*Chemistry.*	*Committee.*
Phytolaccæ radix.	Hydrarg. c. creta.	Aqua.	Prunus virginiana.
Aconitum.	Ferri sulphas præcip.	Acid. Phosphoric.	Quassia
Colchici radix.	Mistura Ammoniaci.	Acid. Tartaric.	Chimaphila.
Cinchona rubra.	Syrupus Rosæ.	Sulphur sublim.	Fœniculum.
Lobelia.	Infusum Digitalis.	Potassii Bicarb.	Oleum Gossypii.
Gaultheria.	Spirit. Aurantii.	Potass.Ferrocyan.	Pulv.Glycyrr. com.
Piper.	Mist.Fer.et Ammon. Acetatis.	Potassii et Sodii Tart.	Tinct. Tolutana.
Sinapis nigra.	Tinct. Cimicifugæ.	Sodii Bicarbonas.	Liq. Sodæ chlorat.
Sassaf. medulla.	Linim. Saponis.	Plumbi Oxidum.	Potassii Chloras.
Terebinthina.	Extr. Colocynth. cp.	Amylum.	Ferri Sulphas.

OPERATIVE PHARMACY.

Syrup.

Iodine	109 gr.
Iron	34 gr.
Sugar (granulated)	800 gr.
Distilled Water	5 fl. dr.

Make two fluid ounces of Syrup of Iodide of Iron by the officinal process.

Powders.

℞ Cinchoninæ Sulphas............ʒj
Glycyrrhiz. Rad. Pulv., gr. xxxvj
ℳ. ft. chart No. xij.

Suppositories.

℞ Ext. Stramonii.
Acidi Tannici.........āā gr. iij
Ol. Theobromæ...........gr. c
Make six moulded suppositories.

Lozenges.

Chlorate of Potassium	60 gr.
Powdered Sugar	200 gr.
Powdered Tragacanth	10 gr.

Make twelve lozenges.

Emulsion.

Make three fluid ounces of an emulsion, each fluid drachm to contain ten minims of Oil of Turpentine. Label the bottle with the name and quantities of all of the substances used.

ANALYTICAL CHEMISTRY.

Qualitative examination was required of officinal salts or mixtures of salts, either in the state of powder or in solution.

The competitive examination for the J. M. Maisch prize, offered by Mr. J. H. Redsecker, took place March 12th. Sixteen candidates were entitled to participate, by having attained the grade "very satisfactory" in the examination of crude drugs and in descriptive materia medica. The microscopical specimens consisted of mounted sections of the following officinal drugs: Apocynum, Aconitum, Cinnamomum (Chinese), Guaiaci lignum, Coriandrum, Juniperus, Stramonii semen, and Linum; also of a section of potato with cell contents, and of the epidermis of a leaf (Agave).

The following list gives the names of all the successful candidates entitled to receive the degree of Graduate in Pharmacy (Ph. G.) at the Commencement held March 19th, and includes several holding over from the preceding year; the titles of the theses presented are also given.

Harry Vin Arny, Louisiana, Parthenium Hysterophorus.
Samuel Aubley, Pennsylvania, Emulsions.

William Bishop Ayres, Maryland, Pharmacy Laws.
Francis Llewellyn Bacon, Pennsylvania, Collecting of Plants for Specimens.
Julius Leopold Baldauff, Kentucky, Rad. Verbasci Thapsi.
Lincoln Gray Barnitz, Pennsylvania, Advantages of Dilution and Solution.
Charles Llewellyn Barrett, Pennsylvania, Sugar-coated Pills.
Henry James Batdorff, Pennsylvania, Syrups by Cold Percolation.
Wm. H. Stevens Bateman, Pennsylvania, Deodorized Tincture of Opium.
David Fuller Bentley, Pennsylvania, Drug Milling.
Harry Rees Birch, Pennsylvania, Important Cereals.
Robert Perry Blackburn, Pennsylvania, Guarana.
Charles Henry Blouch, Pennsylvania, White Snake-root.
Charles Everett Boger, Pennsylvania, Compressed Tablets.
Frank Bowker, New Jersey, Laudanum and Paregoric.
Charles Edward Bowers, Pennsylvania, Oil of Maize.
David Buchanan Bowman, Pennsylvania, Mercurial Ointment.
Augustus Bradley, North Carolina, Psoralea melilotoides.
Walter Lee Brown, New Jersey, Use of the Microscope in Pharmacy.
Harry Edward Burget, Indiana, Erythroxylon Coca.
Simon Mark Butt, Ohio, Life of the Plant.
Frank Hamilton Carman, New Jersey, Pills and Excipients.
Frank Valorus Cassaday, Ohio, Euonymus atropurpureus.
Charles E. Cawley, Iowa, Hydrargyri Chloridum mite.
James Clavin, Texas, Algarobia glandulosa.
William Lowther Codville, Pennsylvania, Orange Tree and Products.
Percival Valentine Cooper, Pennsylvania, Protection to Chemicals.
Charles Marquis Cottam, Pennsylvania, Salix.
Harry Stockton Courson, Pennsylvania, Sulphur and Acids.
George Tindall Craig, Delaware, Pepsin Preparations.
John Henry Crass, New Jersey, Cardamomum.
Archie Darrah Crawford, Pennsylvania, Asclepias tuberosa.
Walter Beattie Crawford, Jr., Pennsylvania, Laudanum.
George James Crumbie, Pennsylvania, Percolation.
William Joseph Daniels, Colorado, Creasote and its Adulterations.
William Owen Davies, Pennsylvania, Eucalyptus globulus.
Pierre Beaumont Davis, Texas, Coffee.
George Arthur Deitz, Jr., Pennsylvania, Fabiana imbricata.
Thomas Donaldson, Delaware, Lappæ fructus.
James Louis Demoville, Tennessee, Preservation of Oils and Fats.
William Albert Dorman, Pennsylvania, Pills and Excipients.
Samuel Conier Du Bois, Pennsylvania, Emulsio Olei Morrhuæ.
Clifford G. Dunn, Illinois, Podophyllum.
Charles Wesley Simons Edenborn, Pennsylvania, Importance of Assayed Drugs.
Frederick Eft, New Jersey, Iris versicolor.
Clarence Selby Eldredge, New Jersey, Assays of Lime Water.
William James Enders, Pennsylvania, Apium.
Charles Samuel Deeg Ensminger, Pennsylvania, Iodoform.
William Evans, Pennsylvania, Bismuth and Preparations.
George W. Fehr, Pennsylvania, Quiz.
Claud Field, Indiana, Percolations.
Harvey James Fiet, Pennsylvania, Nickel.
Stephen Harvey Foulkes, Indiana, Officinal Preparations of Tar.
Walter Scott Froelich, Pennsylvania, False and True Senega.
Cromwell Pearce Gabell, New Jersey, Apis mellifica.
William Foster Ganster, Pennsylvania, Pharmacy of the 19th Century.
Richard Clement Geist, New Jersey, Euonymus atropurpureus.
Henry Robert Gillispie, Kansas, Nepeta Cataria.
Lewis Thompson Greenfield, Pennsylvania, Manaca.

Howard Ezra Griffin, Pennsylvania, Fluid Extract of Stramonium Seed.
Gottlieb Matthew Grosse, Ohio, Ferrum reductum.
DeWitt Clinton Guthrie, Pennsylvania, Syrup of Yerba santa.
Harry Capp Haak, Pennsylvania, Azalea.
Robert Anthony Hatcher, Louisiana, Tincture of Cantharides.
Samuel Light Hauck, Pennsylvania, Astragalus mollissimus.
Maximilian Hellmich, Pennsylvania, Citrine Ointment.
Frederick Gustave Hertel, Illinois, Marrubium and Bitter Principle.
Robert Crockett Hoffecker, Delaware, Petroleum and its Products.
Erdman Hoffman, Delaware, Oleatum Hydrargyri.
Andrew Greider Hostetter, Pennsylvania, Potassii Tartras.
Samuel Emerson Howell, Delaware, An Automatic Percolator.
Ward Dutcher Hume, Minnesota, Cocillana.
Oliver Barron Jacobs, Delaware, Compound Tincture of Gentian.
Henry Hughes James, Pennsylvania, Aluminium.
Peter Lawrence Jones, New York, Gelatin Coated Pills.
John Jacob Kappes, Ohio, Nutmegs and Mace.
Harry Baker Kantner, Pennsylvania, Sulphur.
John P. Kelly, New York, Blackberry Brandy.
Albert Dennis Kennedy, Pennsylvania, Determination of Specific Gravity.
John Frank Kilgus, Pennsylvania, Dobell's Solution.
William Michael Kilgus, Pennsylvania, Quinine Pills.
Charlie Davis Kingston, Missouri, Official Liquors.
Henry Leinbach Klopp, Pennsylvania, Observation in Pharmacy.
Peter Paul Klopp, Pennsylvania, Koumiss.
Henry Kraemer, Pennsylvania, Quercus alba.
Gustav Adolf Krauss, Germany, Rubus villosus.
Frederick William Krollpfeiffer, Pennsylvania, Assay of Opium.
Adolph Latin, Ohio, Mullein Leaves.
Arthur Morris Leine, Pennsylvania, Analysis of Milk.
John Becker Lesher, Pennsylvania, Importance of Attention in Pharmacy.
Griffith Robert Lewis, Pennsylvania, Tincture of Chloride of Iron.
Samuel Wesley Lippincott, Pennsylvania, Adeps Benzoinatus.
Joseph Lowenberg, Pennsylvania, Commercial Sulphate and Acetate of Morphine.
Charles Edward Reese McCloskey, Pennsylvania, Assay of Belladonna.
John Wanamaker McCouch, Pennsylvania, Syrups in general use.
Charlie Hunt McDowell, New Jersey, Cocaine.
Robert McFadden, Pennsylvania, Future of the Retail Drug Business in Philadelphia.
Joseph Allen McKee, Pennsylvania, Officinal Salicylates.
Charles Baynor McKeel, North Carolina, Sun Flower Seeds.
J. Irwin McKnight, Pennsylvania, Potassii nitras.
William Benjamin McMechen, West Virginia, Gum Arabic.
John C. MacMillan, Pennsylvania, Advantages of a Pharmaceutical Education.
Edward Dudley MacNair, North Carolina, Psoralea.
Robert Carson McNeil, Pennsylvania, Suppositories.
Gideon Hunt Macon, North Carolina, Pills of Permanganate Potassium.
Frank Street Macpherson, New Jersey, Oleum Gossypii Seminis.
Robert Wood Maris, Pennsylvania, Liquor Ferri Chloridi.
Henry John Mayers, West Virginia, Geranium maculatum.
Charles Clyde Meredith, West Virginia, Antipyrine.
Charles John Austin Miles, New Jersey, Borobenzoate of Sodium.
Louis Augustus Minner, Missouri, Oleum Peponis.
Henry Mittelbach, Missouri, Arum triphyllum.
John Moffet, Pennsylvania, Formulas of the New Pharmacopœias.
John Ellsworth Mohn, Pennsylvania, Suppositories.

John Daniel Moller, Pennsylvania, Urinum.
William Bossieux Moody, Virginia, Infusions.
Joseph Garrison Morris, New Jersey, The Medicinal Plants of Cape May County, N. J.
William Moss, Ohio, Carbolic Acid as a Disinfectant.
Reuben Emanuel Moyer, Pennsylvania, Hydrastis.
James Joseph Murray, Pennsylvania, Fluid Extract of Senega.
Aaron Wallace Musgrave, Pennsylvania, Commercial Mustard.
Carvosso Oursler Myers, Kansas, Scutellaria lateriflora.
Emma Bour Nardyz, Pennsylvania, Opium.
Milton Mackey Osmun, New Jersey, A Well-Regulated Pharmacy.
Harold Duche Owens, Pennsylvania, Emulsions.
Osmund Young Owings, South Carolina, Carbonates of Sodium.
Charles W. Palmer, New Jersey, Camphoral.
William Abner Pierce, Pennsylvania, Petrolatum.
M. Arthur Porter, Pennsylvania, Pharmacy Law of Pennsylvania.
John Franklin Potts, Pennsylvania, Fermentation.
Fred Briggs Quackenbush, New York, Officinal Tinctures.
Charles Carroll Ramsay, Iowa, Amylum.
George Herbert Ray, Oregon, Eupatorium purpureum.
Howard Lincoln Rayner, Pennsylvania, Phosphorus.
Joel Salter Reading, New Jersey, Syrups by Cold Percolation.
Thaddeus Rowland Redner, Pennsylvania, Fluid Extracts.
Howard Reed, Pennsylvania, Mercuric Chloride.
Edwin Stanton Reider, Pennsylvania, Medicinal Catechu.
Eugene George Reig, Pennsylvania, Japanese Aconite.
Howard Newton Richard, New Jersey, Mortars and Pestles.
Frederick Philip Riedenauer, Pennsylvania, Pills and their Coatings.
John Dauberman Rishell, Pennsylvania, Honey.
Leon Stewart Risley, Connecticut, Quebracho Blanco.
Cyrill Depue Rosenkrans, Pennsylvania, The Egg in Pharmacy.
William McOwen Ross, Indiana, Pressure Percolators.
Michael Joseph Rourke, Pennsylvania, Fluid Extract of Wild Cherry.
August James Schlaepfer, Indiana, Benzoated Lard.
Henry John Schulte, Ohio, Simaruba officinalis.
August Schutzenbach, Pennsylvania, Physostigma.
Leslie Watts Schwab, Illinois, Ambrosia artemisiæfolia.
Charles Albert Schwacke, South Carolina, Household Ammonia.
William Henry Schwenk, Illinois, Putrefaction and its Causes.
Joseph Bennett Sherman, Pennsylvania, Antiseptics.
Robert Simons, Pennsylvania, Black Pepper.
John Henry Seiffert, Pennsylvania, Thymol.
John Hamilton Small, Jr., Pennsylvania, Thea sinensis.
Frank H. Smith, Pennsylvania, Eupatorium.
John Stewart Smith, Kentucky, Bark of Prinos verticillatus.
Walter Valentine Smith, Pennsylvania, Medicinal Oleates.
Edward Stanhope Smythe, Texas, Gnaphalium polycephalum.
Isaac Morris Supplee, Pennsylvania, Lac.
Charles Morton Southall, Tennessee, Tobacco.
Willie Leisse Stephen, Pennsylvania, Alkaline Bromides.
Fred. Madison Stevens, Maine, Tea Analysis.
Aaron Walter Stewart, Pennsylvania, The Pharmaceutical Physician.
David Falls Swisher, Pennsylvania, Coniferæ.
Herbert Moodie Thompson, Pennsylvania, Coal Tar, its Origin and Products.
Edward Quin Thornton, Alabama, Antiseptic Ligatures.
Samuel W. Upham, New York, Silicate of Aluminium.
William Clinton Van Dyke, Pennsylvania, Sodium Silico-Fluoride.
Samuel Edward Wagaman, Pennsylvania, Sulphate of Morphine Granules.

J. Frank Wallis, Pennsylvania, Picrotoxin.
Percy Hall Ward, Maryland, Fluid Extracts.
Edmund Howell Watkins, Pennsylvania, Tincture of Nux Vomica.
Maurice Watson, Pennsylvania, Rheum.
Charles Henry Weaber, Pennsylvania, Pills and Pill Excipients.
William Weber, Pennsylvania, Liquor Plumbi Subacetatis.
Joseph L. Weil, Pennsylvania, Lycopus.
E. Riall White, Maryland, Incompatibility of Unguentum Belladonnæ and Tannin.
Robert Walter White, Pennsylvania, Sugar.
Joseph Washington Wischman, Pennsylvania, Acetic Acid.
John Howard Witherow, Pennsylvania, Pill Making in Pharmacies.
Harry Sudduth Wood, Kentucky, Glacial Acetic Acid.
John Stewart Woodruff, New Jersey, Pepsins.
Charles Young, Pennsylvania, Prescriptions and Dispensing.
William Corson Zinnel, Pennsylvania, Oleum Tiglii.

States and Countries represented by the Graduating Class: Alabama, Colorado, Connecticut, Germany, Maine, Minnesota, Oregon and Virginia, each 1 graduate; Iowa, Kansas, Louisiana, South Carolina and Tennessee, each 2 graduates; Kentucky, Maryland, Missouri, Texas and West Virginia, each 3 graduates; Illinois, New York and North Carolina, each 4 graduates; Indiana 5; Delaware 6; Ohio 7; New Jersey 17, and Pennsylvania 106 graduates.

On Monday evening, March 18th, the graduating class, in response to an invitation from the faculty, sat down to a supper in the museum of the college building, in company with the officers and trustees of the college, the occasion being enlivened by toasts, speeches and singing by the glee club.

At the commencement held on the following evening at the Academy of Music, the President of the College conferred the degree of Graduate in Pharmacy upon the candidates named above, and a certificate of Proficiency in Chemistry was awarded to Hermann J. M. Schroeter, Ph. G., for special studies in chemistry after having graduated in pharmacy. By direction of the Board of Trustees the degree of Master in Pharmacy was conferred—*honoris causa*—upon Charles Bullock of class 1847, T. Roberts Baker of class 1852, Joseph L. Lemberger of class 1854, Alonzo Robbins of class 1855 and Professor John M. Maisch. The Procter medal for highest grade of scholarship and meritorious thesis was awarded by President Bullock to F. B. Quackenbush of Penn Yan, N. Y., and honorable mention with the grade "distinguished" to H. V. Arny, G. A. Krauss, E. S. Reider, J. H. Small, C. M. Southall and J. L. Weil; and with the grade "meritorious" to J. Clavin, G. A Deitz, Jr., H. R. Gillispie, R. A. Hatcher, H. V. Haak, J. F. Kilgus, H. Kraemer and G. H. Ray. The Secretary of the College, Wm. B. Thompson, presented the Henry C. Lea prize, $100, for the most meritorious researches recorded in the graduating dissertation, to Henry Kraemer of Philadelphia, honorable mention being accorded to G. A. Krauss. The professors' prizes were awarded as follows: The Materia Medica prize, a Zentmayer microscope, for original histological work on an American plant, combined with chemical researches, to H. Kraemer, with honorable mention of the investigations by H. V. Arny and Geo. H. Ray; the Pharmacy prize, a gold medal, for original pharmaceutical work to F. B. Quackenbush, with honorable mention of C. D. Kingston and S. E. Howell; the Chemistry prize, a chemical balance for original quantitative analysis to G. A. Krauss, with honorable mention of F. V. Cassaday, G. A. Deitz, Jr., and Jos. L. Weil; and the Analytical Chemistry prize, $25, for laboratory work during the preceding year, to F. B. Quackenbush. The four remaining prizes were bestowed as follows: the John M. Maisch prize, $20 gold, offered by Mr. J. H. Redsecker, of Lebanon, Pa., for histological knowledge of drugs, to Aug. Bradley, with honorable mention of H. V. Arny, J. L. Baldauf, C. E. Bowers, J. Clavin, G. A. Deitz, Jr., W. A. Dorman, H. R. Gillispie, H. V. Haak, H. Kraemer, G. A. Krauss, F. B. Quackenbush, E. S. Reider, J. H. Small, C. M. Southall and F. M. Stevens; the Operative Pharmacy prize, $25 gold, offered by Mr. E. L. Boggs of Charleston, W. Va., for best work in operative pharmacy to W. B. Crawford, Jr., with honorable mention of F. B. Quackenbush, R. E. Moyer, J. E. Macmillan and J. B. Sherman; the Theoretical Pharmacy prize for best examination in that branch, a prescription balance, offered by Mr. H. J. Maris of Philadelphia, to E. S. Reider; and the Robinson gold medal, offered by Mr. Jas. S. Robinson of Memphis, Tenn., for proficiency in chemical knowledge and analytical work, to C. M. Southall.

The valedictory address was delivered by Prof. Maisch. The prerequisites for, and the aims of, special education were discussed with particular application to pharmacy. Since the establishment of the College, many changes have taken place in the practical conduct of the apothecary business. These changes are referable to the general progress of knowledge, the perfection of machinery and the division of labor in modern times, and are not confined to any particular locality or country. But the duty of the pharmacist toward the public remaining unaltered, he becomes responsible not only for the products made by himself, but also for those made by others, if he chooses to use such; and his field of labor, narrowed in one direction, would become largely extended in another, that of chemical and microscopical analysis. The changes in business methods have been followed by changes in the college curriculum; new chairs have been established; the didactic course of instruction was lengthened and widened; the auxiliary branches of science are more cultivated; facilities have been provided for laboratory work in chemistry, pharmacy and microscopy, and such work is urged—not as replacing practical experience in regular business transactions, but as aiding and supplementing shop instruction.

The exercises opened and were interspersed with music, and came to a close with the distribution of the presents sent upon the stage for some of the graduates.

Alumni Association, Philadelphia College of Pharmacy.—The twenty-fifth annual meeting was held on Friday, March 19th, 1889. The Secretary reported the addition of 171 new members and the death of 13; the Board meetings were held regularly, and increased interest in the social meetings was manifested; the Quiz classes were well attended and the reading room of the College had been re-opened during the Winter season. The President's address dwelled upon the successful exhibition held in commemoration of the silver anniversary and upon plans for the future usefulness of the association. The Treasurer reported the association in a very satisfactory financial condition. After other routine business, the election of officers was held as follows: Dr. B. Frank Sholl, class 1882, President; Wm. Nelson Stem, class 1873, and Joseph W. England, class 1883, Vice Presidents; Edward C. Jones, class 1864, Treasurer; Wm. E. Krewson, class 1869, Recording Secretary; C. C. Meyer, class 1873, Corresponding Secretary; Thomas H. Potts, class 1871, Henry A. Newbold, class 1870, J. Thomas Hoskinson, class 1871, and John A. Martin, class 1877, members of the Executive Board for three years. Trustee of Sinking Fund, Thomas S. Wiegand, class 1844. Orator for 1890, Emlen Painter, class 1864, New York City. This was the largest annual meeting ever held, no doubt on account of many druggists coming to visit the exhibition, being held at the same time.

In the evening the annual reception was held at St. George Hall, which was crowded. The annual address was delivered by Dr. Henry Fisher, class 1877; the class oration by Henry Kraemer of Philadelphia; the History of the Class, by Henry S. Wood of Kentucky; the Future of the Graduating Class, by Samuel E. Howell of Delaware, Class Prophet; and the poem was recited by James Clavin of Texas, Class Poet. The prizes as follows were awarded: The gold medal to F. B. Quackenbush of New York; and the following certificates: Materia Medica to H. R. Gillispie of Kansas; Pharmacy to E. S. Reider of Pennsylvania; Chemistry to G. A. Krauss of Germany; General Pharmacy to Harry Vin Arny of Louisiana; Operative Pharmacy to W. B. Crawford of Pennsylvania; Specimens to F. G. Hertel of Illinois; Analytical Chemistry to G. A. Deitz, Jr., of Pennsylvania; the testimonial to the Junior class was carried off by Ellis Beam Burgess of Pittsburg, Pa., and the prize certificate for the best collection of indigenous plants by Jos. L. Weil of Pennsylvania. The Zeta Phi Glee Club interspersed the exercises with songs and musical selections.

An "*Exhibition of Progress in Pharmacy and Allied Arts and Sciences*," was held by the Alumni Association of the Philadelphia College of Pharmacy in celebration of its 25th anniversary. The exhibition was opened on Tuesday, March 12th, at 8 P. M., by a reception given to the Alumni and invited guests, and on the three succeeding days and evenings it was thrown open to the public, and was well attended by large numbers of visitors.

In the Library, the Instructor in Microscopy, Albert P. Brown, Ph. G., had arranged an elegant display in that branch, which was both entertaining, and instructive, and to many a revelation.

In the Museum which had been specially prepared with tables, draperies, lights, etc., French, Richards & Co., made a very fine display of some thirty rare drugs, such as cowage pods, white agaric, spunk, etc., also pharmaceutical preparations, a novelty being "liquid benzoin;" also a number of Torsion balances of which they are the agents in this city.

Henry C. Blair's Sons displayed choice coca leaves and preparations, new glycerin suppositories, etc., also their father's lecture tickets and recipe book of 1837.

Henry Troemner exhibited his renowned balances, amongst them being an assay balance used in the U. S. Mint 100 years ago.

Wm. R. Warner & Co. displayed pills, bromo-soda and various specialties; also their first business card, Quaker like in its plainness, and their last one beautifully lithographed.

Zentmayer's Sons exhibited some of the microscopes which have made their house famous.

The Smith & Kline Co. displayed pharmaceutical preparations, such as liquors, elixirs, etc., also a number of rare and curious drugs, such as Guarana paste moulded in shape of a bird, cones, rings, etc., copaiba wood, East India rhubarb, and varieties of cardamom, vanilla, strophanthus, etc.

Croft, Allen & Co. showed candies, prepared San Blas cocoanut, various saccharine preparations, etc.

James T. Shinn exhibited liquid rennet, and also the rennet of our grandfathers. A bladder with a quill inserted, was entitled the syringe of a hundred years ago, and was explained by a copy of a prescription of July 3rd, 1776, "Send a bladder with a quill to give a clyster;" contrasted with this was the syringe of 1854, and the "Alpha" of the present time.

Mellor & Rittenhouse displayed liquorice and its preparations, and paraffin paper.

Graff & Dannebaum made a fine exhibit of Merck's rare chemicals, contrasted with which were some pharmaceutical preparations of by-gone days, like dog oil, goose greese, rattlesnake oil, oil of earth worms, etc.

Professor Maisch's exhibit had been tastefully arranged by Dr. Lowe. The lower part of the case was filled with many hued models of flowers, used in teaching botany, and contained also an original package of Para sarsaparilla from South America; a bundle of chirata from India; koosso flowers from Abyssinia; a monkey skin filled with aloes from Eastern Africa; specimens of cinchona barks from South America and India; pictures from China painted on thin sections of the pith of Aralia papyrifera (the so-called rice paper), etc.

Powers & Weightman's exhibit was "a thing of beauty," the centre being occupied with a handsome specimen of ammonium nitrate that looked like a fairy grotto; around the base were grouped many fine chemicals, the crystals of manganese sulphate and silver nitrate attracting special attention.

Rosengarten & Sons made a fine display of cinchona and opium alkaloids and other chemicals.

Hance Bros. & White had on exhibition various pharmaceutical preparations, special mention being made of their fluid extracts of ergot and belladonna. They also exhibited a mortar hollowed out of an oak log the bark still adhering, the pestle being of stone. It was owned by one of their ancestors, Major Paulding, who assisted in the capture of Major Andre, and was said to be about 175 years old.

Wilbur & Sons exhibited the fruit and seeds of Theobroma Cacao and a full line of preparations made therefrom, including cacao butter and chocolates.

Stevenson, Barnes & Jester showed bismuth subnitrate and other fine chemicals.

Chas. Shivers exhibited a line of plasters; also the original roll of adhesive plaster made in 1854, for which he received the silver medal from the Franklin Institute, and which is still in good condition.

Bullock & Crenshaw made a fine display of chemical apparatus, notably such of modern construction.

W. P. Burk & Co. showed different kinds of sponges and corks; also the Elma Company's medicated candies.

Gilpin, Langdon & Co., of Baltimore, showed a line of assayed drugs in fine powder and in a condition suitable for percolation.

In the Chemical Laboratory, J. M. Maris & Co. exhibited very attractive modern store furniture, among which was an elegant walnut prescription counter, section of shelving, etc., all fitted up in an elaborate manner. Directly opposite, and contrasting with these, was an imitation section of the store of Dr. Glentworth, of Chester and Race streets, which dates back to 1812; it was fitted up with some of the ancient drawers, bottles, ointment jars and scales loaned for the purpose. It is almost needless to say that it attracted great attention.

Professors Sadtler and Trimble displayed old and modern chemical and physical apparatus, such as microscopes, polariscopes, spectroscopes, dipping batteries, furnaces, etc., illustrating the vast improvements made in their construction.

Professor Remington and his assistant, F. G. Ryan, Ph. G., exhibited an instructive collection of pharmaceutical apparatus and preparations, the former arranged, in a number of instances, to show the evolution that has taken place in the same; thus, the pharmaceutical stills commenced with the old leaden one formerly in use by Prof. Procter, and ended with the modern "Remington still." The preparations of the students offered in competition for the Pharmacy prize attracted much attention; as did the model of the essential oil factory of Mr. Todd of Nottawa, Mich.; also the prescription file of the first year in business of the late Prof. Procter.

Frederick Gutekunst, class of 1853, the well-known photographer, exhibited specimens of his art, amongst them being photographs of the first building occupied by the College on Seventh street, the second building on Zane street, the present building on Tenth street, and the proposed new front (the latter from the architect's drawings).

Robert Shoemaker & Co. exhibited a fine line of drugs, extract of beef, etc.

Whitall, Tatum & Co. displayed an extensive variety of glass ware for the use of druggists, pharmacists, and for other purposes.

William Procter, Jr., Co., showed pepsin products; A. P. Brown, effervescing salts, and Keasby & Mattison illustrated magnesia and its products, of which they claim to be the largest manufacturers in the world.

In this room was shown the evolution of the drug mill from the model of the one found in the ruins of Pompeii (exhibited by Howard B. French) to the modern ones, like that of Hance Bros. & White; also the evolution of the soda water fountain, by Chas. Lippincott & Co.

H. K. Mulford & Co. attracted much attention by their crown compressed pill machine, as did Dr. McFerran, with his latest one, designed for the retail trade.

The annex to the Chemical Laboratory was fitted up with chemical apparatus in actual use, illustrating the processes of filtration by means of a vacuum, fractional distillation, combustion, etc. In marked contrast with the old Liebig combustion apparatus, in which charcoal was used, was the modern one, in which the easily regulated heat is produced by a row of Bunsen burners.

One of the most interesting features of the exhibition was the collection of rare and curious specimens of pharmaceutical and medical literature, some of the books dating back to the beginning of the sixteenth century. A recipe contained in one volume called for the flesh of a young man about 24 years of age, not too full blooded, and free from disease. The flesh was to be steeped in spirits of aloes and myrrh for a certain time, then dried by hanging in the air, then again steeped, and so on until fit for medicinal use.

Suspended over the case containing these works was the ancient and venerable looking sign of Townsend Speakman (the great-grandfather of Prof. Remington) who was in the drug business at Second and Market streets, prior to and during the revolutionary war.

Many other things deserve to be mentioned if space allowed; it is perhaps sufficient to say that as a whole the exhibition was instructive as well as beautiful, and symmetrical in all its arrangements, and received the highest praise.

The committee of the Alumni Association in charge of the exhibition consisted of Howard B. French, Prof. Joseph P. Remington, Dr. C. B. Lowe, Wallace Procter, and William Nelson Stem.

The Maryland College of Pharmacy held its thirty-seventh commencement March 26th, at the Lyceum Theatre when the following received the degree of Graduate in Pharmacy:—Edward H. Allen, *Charles C. Anderson, John M. Benton, T. H. Bien, J. W. H. Boone, *F. W. Bowers, William E. Brown, S. C. Chancellor, William M. Cohen, B. Cooling, Jr., F. W. Dickson, Jos. T. Doster, Louis Dreass, W. W. Frames, John A. Graham, *Charles E. Green, H. Hammerbocker, J. L. Houston, J. S. Johnston, A. E. Kiesling, Frank J. Kirby, F. W. Klingenhoefer, Louis Keuthe, F. W. Lelanze, A. M. Lichtenstein, Henry Linderman, F. R. McClure, Joseph W. Moore, E. A. Munos, John C. Norris, W. C. Parkhurst, H. B. Penn, George H. Rearick, L. S. Ricketts, D. W. Rintels, L. B. Sasser, Emil Schultze, H. V. Schumann, C. D. Sedberry, Charles Selden, E. S. Shannon, Whitfield G. Smith, R. S. Van Devanter, John J. Veasy, J. A. Wager, R. Frank Waters, William P. Way, J. W. Wescott, Thomas A. White, William A. Wright, J. Miles Yost.

Prizes consisting of gold medals were awarded to the four graduates whose names are marked with an asterisk (*).

The Cincinnati College of Pharmacy held its seventeenth commencement at Musik-Verein Hall, March 14th. The graduating class consisted of Aug. Bauer, Rufus S. Burnett, L. F. C. Cramer, Chas. Fleischmann, C. Fredericks, Jr., Wm. F. Fuldner, H. H. Grothaus, H. Herr, A. A. Krieg, Max Metzger,

G. J. Mitchell, Jos. W. Morford, Victor C. Muehlberg, H. Nippert, A. F. Schmidt, W. V. Skillman, H. W. Stegemiller and L. C. Widrig. According to the printed program, several prizes were awarded, and the Alumni Association made a presentation to the College. Addresses were made on behalf of the Trustees, by Prof. Dr. D. Millikin of the Miami Medical College, on behalf of the Faculty by Prof. T. H. Norton, Ph. D., also by the president of the College, A. W. Bain, and by the president of the Alumni, Ed. Muehlberg.

The Louisville College of Pharmacy held its commencement March 8th, at Macaulay's Theatre, the graduating class consisting of John H. Buschmeyer, *George W. Buschmeyer, Isidor Flexner, J. K. Higgins, J. D. Jansing, H. C. Leinberger, F. W. Leonhardt, F. P. Schneider, H. P. Tracy, J. Weinedel, Will Zubrod, Kentucky; Henry Gauss, Jesse Louis, G. E. Mergell, Indiana; *F. C. Robinson, Missouri; * J. S. Wells, Florida.

Prizes were carried off (five by Mr. Wells) by the graduates marked *.

The St. Louis College of Pharmacy had its twenty-third annual commencement. Oscar F. Baerens, Adolph H. Behrens, Gottlieb L. Blum, Sherman L. Bowman, Joseph T. Carey, Elmer F. Davis, Henry L. Goodman, Frank J. Hartmiller, Rudolph Heine, Hugo Herold, Albert J. Kopf, Henry W. Kroeker, Benjamin H. Levy, William H. Loomis, Wallace S. Macfarlane, George R. Merrell, Emil L. J. Naumann, Clarence M. Nicholson, Frank Birch Nickey, Thomas M. Ogilvie, John A. Peetz, Walter S. Polland, George E. Remick, Henry C. Reynolds, Henry E. Schmidt, Arthur Schrumpf, Emil W. Schwambach, George C. F. Seidlitz, John S. Kaer, Edward Streicher, Owen T. Stratton, George Henry Swift, John Walker, James T. Wortham. A gold medal was awarded to H. L. Goodman, and two prizes to J. T. Wortham. The recipient of the Junior class prize was O. A. Hornback.

The Connecticut Pharmaceutical Association held its thirteenth annual meeting at Hartford, February 5 and 6. President Daboll presided and read a business-like address. The Treasurer reported the finances of the Association to be in a healthy condition, $1200 being invested in bonds. Reports were also made by the Secretary and the standing and special committees, and papers were read on "Education of Pharmacists," by D. G. Stoughton, and on "Practical Pharmaceutical Notes," by J. K. Williams. A resolution was adopted directing the appointment of a committee to confer with the faculty of Yale Medical College with the view of providing facilities for the education of young pharmacists. The Secretary of the Association, F. Wilcox, was elected a delegate to attend the next meeting of the American Pharmaceutical Association, his traveling expenses to be paid from the treasury. A committee was appointed for elaborating a plan by which all licensed pharmacists would become members of the Association.

The next annual meeting will be held in Danbury in February, 1890. The present officers are: President, D. G. Stoughton, Hartford; Vice-Presidents, L. E. Southworth, Southington, and J. M. Brewer, Norwich; Treasurer, L. H. Goodwin, Hartford; Secretary, F. Wilcox, Waterbury; Local Secretary, T. G. Bodine, Danbury.

An Association of Pharmacists of Dallas, Texas, has been formed with the primary object of extending hospitalities to the State Association on the occasion of the meeting of the latter, May 14. It is the intention that the local organization be continued. Mr. J. L. Williams is the presiding officer.

The American Medical Association will hold its fortieth annual meeting at Newport, R. I., commencing June 25. The Chairman of the Committee of Arrangements is Dr. Horatio R. Storer. An exhibition will be held of articles in which physicians may be interested; the arrangements for this exhibition are in the hands of a sub-committee, of which Chas. A. Brackett, of Newport, R. I., is Chairman.

EDITORIAL DEPARTMENT.

The Excursion to the Pacific Coast.—The chairman of the Committee on Arrangements has secured special rates for an excursion to San Francisco and return, starting from New York June 13th, via the West Shore Railway to Chicago, and via the Chicago and Northwestern Railway through Illinois, Iowa and Nebraska to Denver; thence to Manitou and Colorado Springs. It is intended to spend about two days each in Denver and Manitou, and then travel via Pueblo, the Grand Cañon of the Arkansas, the Marshall Pass (10,852 feet above the sea), the Black Cañon of the Gunnison, etc., to Salt Lake City, where a halt will be made for one day, when the journey will be resumed via Ogden and Reno to San Francisco, reaching that city early on Sunday morning, June 23d. On the return trip it is proposed to visit Portland, Tacoma, Seattle, Victoria, and the Yellowstone National Park, spending five days in the latter. The remaining portion of the return trip passes through Montana, Dakota and Minnesota to Chicago.

The fare for the round trip from and to New York will be $135, to which must be added $15 for the trip from San Francisco to Portland, $5 for the trip to Victoria, and $41 for sleeping-car accommodations. Meals are not included; but full hotel accommodations are included in the cost of the Yellowstone Park trip, which will be $40 for the five days.

While the rates announced in the circular—which may be obtained from Prof. E. Painter, Broadway and 34th St., New York—are for New York City as the starting point, members and their friends may join the party at the various stopping places, and, we presume, that particulars as to the fare from other cities will be announced in a short time.

Changes of Meetings of State Associations.—Thus far we have received notice of two changes in the dates of meetings, for the purpose of enabling members to attend also the meeting at San Francisco. The New York Association will meet at Binghamton, June 4th, and the Pennsylvania Association at Scranton on the same day.

Manufacture of Chloroform.—More than fifty years ago Liebig demonstrated that on heating acetone with chlorinated lime in the presence of water chloroform was produced. Owing to the high price of acetone this discovery was only of scientific interest until of recent years acetone was largely and cheaply manufactured from acetates for various purposes in the arts, and was also utilized for the manufacture of chloroform, for which purpose the derivative of distillation of wood is a far cheaper source than alcohol. Dr. G. Michaelis having secured a patent for the manufacture of chloroform from products of dry distillation containing various ketones beside acetone, suits were commenced against manufacturers using the latter. On Thursday, March 28th, Judge Butler, of the United States Circuit Court, filed his opinion in this chloroform case with the Clerk of the Circuit Court at Trenton, N. J. The case had been before the Court for three years, during which time Messrs. Roessler & Hasslacher, of New York, had been restrained in the manufacture of chloroform by an injunction on an infringement issued in favor of Michaelis and others, who claimed damages amounting to nearly a quarter of a million of dollars. The latter phase of the case was for contempt, of which the defendants have been purged by the opinion just rendered, and the case dismissed.

The Royal Academy of Sciences at Turin announces that in the competition for the seventh Bressa prize, according to the testator's will, scientific men and inventors of all nations will be admitted; and that the prize will be given to the scientific author or inventor, whatever be his nationality, who during the years 1887–90 "according to the judgment of the Royal Academy of Sciences of Turin, shall have made the most important and useful discovery, or published the most valuable work on physical and experimental Science, Natural History, Mathematics, Chemistry, Physiology and Pathology, as well as Geology, History, Geography and Statistics." The term will be closed at the end of December, 1890. The value of the prize amounts to 12,000 Italian Lire. The prize will in no case be given to any of the National Members of the Academy of Turin, resident or non-resident. The announcement is signed by the President of the Royal Academy, A. Genocchi, and by the Secretary of the Committee, A. Naccari.

OBITUARY.

William James Martin died in Cincinnati, February 7th, aged 49 years. He had been engaged in business in Cincinnati for a series of years, and was an active and efficient member and a former treasurer and president of the College of Pharmacy of that city.

Dr. William Weightman, Jr., died in Philadelphia, February 11, aged 43 years. He had studied medicine, but for a number of years was actively connected with the firm of Powers & Weightman.

John Williams died in London, March 3, aged 65 years. He served his apprenticeship with the late Thomas Morson, was one of the earliest students of the School of Pharmacy of the Pharmaceutical Society of Great Britain, and passed the examinations with honor in 1844. With Mr. Hopkin he established the firm of Hopkin and Williams, which was carried on for nearly forty years. In 1870 he became a member of the Council of the Pharmaceutical Society, and served for several years as treasurer and as president. He has also been president of the British Pharmaceutical Conference. Mr. Williams was the author of numerous valuable papers on subjects connected with pharmacy and pharmaceutical chemistry, many of which were republished in this Journal, either in extenso or as abstracts.

THE AMERICAN
JOURNAL OF PHARMACY.

MAY, 1889.

OLIVE OIL.

By Frank X. Moerk, Ph. G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 50.

About two months ago I was presented with two specimens of Lucca oil by the agent in this city with the avowal that the oils were guaranteed pure and that they could be subjected to all known tests of purity; a little later samples of California oils were placed at my disposal by Prof. Trimble, the samples having been presented by the manufacturers through one of our late graduates to the college cabinet. The comparison of American with foreign olive oil to my knowledge never having been made, this task was undertaken and the results herewith made known. Each set of tests was made at the same time so as to insure like conditions and comparable results.

Specific gravity determined in 50 gram. bottle at 15.5° C.

Odor. On heating the oils in test tubes, only Cooper's oils gave a decided odor, resembling that of leather, due possibly to incipient rancidity.

Color tests. Sulphuric acid. Two drops acid placed upon twenty drops of the sample, the color noted before and after stirring.

Nitric acid. Three volumes oil agitated for two minutes with 1 volume nitric acid sp. gr. 1·42, observing the color of the oil after separation. Only a tinge of color was imparted to the acid.

Silver nitrate and *gold chloride* tests were applied as stated in Am. Jour. Pharm., 1889, p. 65. It appears that age and exposure with the latter test should be taken into consideration, as one of the oils tested shortly after its reception did not give any reaction, but recently examined gave a purple color.

Elaidin reaction. 10 cc. oil agitated every ten minutes for two hours with 0·4 cc. of a solution of 1 cc. mercury in 12 cc. *cold* nitric acid, sp. gr. 1·42.

Temperature turbidity. 3 cc. oil and 3 cc. glacial acetic acid (99.5 per cent.) were heated until perfect solution ensued, when a thermometer was introduced and the temperature noted at which the lower portions became distinctly turbid. The higher temperature obtained for olive oil by E. Valenta and quoted in Allen's Organic Analysis may be due to the use of a weaker acid; in this country, it is stated, an eighty per cent. acid is very often sold as "glacial." This test is especially important as a means of detecting cruciferous oils which are not soluble in the acid even at its boiling point.

Free acid and *saponification equivalent* determined in the same test by first adding to a weighed portion, 2 to 3 gm. in a flask, 10 cc. neutral alcohol, boiling and titrating with approximately semi-normal alcoholic potassium hydrate, using phenolphthalein as indicator, until a permanent red color after agitation is obtained; the acidity is calculated as oleic acid. An excess of the alkaline solution is now added (the balance of 25 cc.), the flask connected with an inverted condenser and heated in a water-bath for one-half hour, after addition of a little more indicator the excess of KOH is determined with oxalic acid (12.6 gm. per litre); the difference between the oxalic acid required in this experiment and that required in a blank experiment (carried out without the oil) represents the acid, as oxalic acid, necessary to decompose the oil; to obtain the saponification equivalent, which is the amount of oil decomposed by 56.1 parts KOH or 63 parts oxalic acid, the weight of oil taken is multiplied by 500 and the product divided by the number of cc. of oxalic acid of above strength gotten as the difference between the actual and blank experiments. Oxalic acid was used because it can be obtained of such purity that it does not require the repeated trials in standardizing; there is a precipitate of oxalate of potassium formed at the beginning of the titration, but as the alcohol becomes more dilute, by the addition of the aqueous oxalic acid, this redissolves and there is no trouble in ascertaining the end of the titration, the yellow color succeeding the red sharply.

Iodine-absorption represents the percentage of iodine absorbed by the oil when treated with alcoholic solution of iodine and mercuric chloride. The test was strictly applied as given in Allen.

Fusing point of the fatty acids obtained by using thin glass tubes closed at one end and charged with about 1 cm. of the fused acid by heating the tube and holding below the surface of the acid, as the tube cools the acid rises; by inverting the tube and tapping it the acid will flow to the bottom, and now by a little clever management the acid can be divided in two parts, separated by an air bubble; the tube is then set aside for a few hours at a temperature below the solidifying point of the fat. To take the fusing point, the little tube is attached to a thermometer and placed in a beaker of water, which, in turn, is placed in another beaker of water, and heat applied to the latter by placing on a hot iron plate. The temperature indicated when the two portions of the acid run together is that figure given first, the second figure representing the temperature when the fused acids become transparent. Under the head "Standard" are given such results as have been constantly obtained in the examination of pure oils (all European), and hence used for comparison.

Some of the above tests were also made with a so-called salad oil, a mixture of arachis and sesame oils, and with cotton-seed oil.

From the results of all of the tests would appear the purity of all the olive oils examined; the California oils differing from the foreign oils decidedly in some of the accepted tests of purity, it may be well to mention these in detail.

1. A high specific gravity; L. Archbutt, in 89 samples examined found few oils to reach 0.917, his variations are stated between 0.9136 and 0.917; the U. S. P. and Pharm. Germ. adopted 0.915 to 0.918; if the presence of free acid is considered in the California oils the specific gravities found are exceptionally high, the presence of free acid reducing the specific gravity considerably.

2. Intenser reactions with the acids; these tests should not be relied upon too implicitly for two reasons; firstly, pure oils when fresh may be affected but little by acids, but after a time may be affected considerably; secondly, the oils used as adulterants which at one time gave unmistakable color reactions are now so fully purified as to give little reaction with these same tests; of eight samples of cotton-seed oil examined no two gave like reactions with the acids.

3. The elaidin-reaction requires a longer time than with the European oils.

Olive Oils.	Color.	Specific gr. at 15·5 °C.	H_2SO_4.		HNO_3.	Ag NO_3.		Au Cl_3.
			Before stirring	After stirring.		After 15 minutes.	After 1 hour.	After 20 min.
Standard	Colorless to light yellow or green.	0·9136–0·917	Yellow, green or pale br'n.	Light brown or olive gr'n.	Colorless, yellowish, or greenish.	Should give no	dark precipitate.	No change.
American Oils.								
Kimball	Yellow tinge.	0·91747	Yellowish brown.	Dark brown.	Brownish.	Slightly green.	Greenish solid.	Ppt. of gold.
Cooper, First pressing.........	Faintly yellow.	0·91797	Yellowish green.	Brown.	Light brown,	Brown.	D'k gray brown, viscid.	Ppt. of gold.
Cooper, Second pressing	Golden yellow.	0.91767	Green.	Brown.	Light brown.	Green.	Greenish solid.	No change.
Foreign Oils.								
Mottet	Golden yellow.	0·91510	Yellowish green.	Olive.	Light yellow.	Green.	Greenish, viscid.	No change.
Rae, finest Subl.	Golden yellow.	0·91718	Green.	Olive.	Yellow.	Green.	Green, viscid.	No change.
Rae, Sublime....	Green.	0·91696	Brown.	Dark brown.	Light brown.	Green.	Green, viscid.	Purple color.
Lucca	Golden yellow.	0·91554	Yellowish brown.	Brown.	Light yellow.	Green.	Green, viscid.	No change.
Other Oils.								
Salad..............	Yellow tinge.	....	Red.	Light red brown.	Red brown.	First a red color, then green ppt.	Gray bl'ck, thick.	Red color.
Cotton-seed	Golden yellow.	0·92303	Yellowish red	Light red brown.	Red brown.	Dark brown ppt.	Green, viscid; d'k brown ppt. on sides of test tube.	Red color.

Olive Oils.	Elaidin-Reaction.	Temperature Turbidity, °C.	Iodine Absorption.	Saponification Equivalent.	Free Acid.	Melting point of fatty acids.
Standard	Pale yellow, or almost white. Solid in less than two hours	Green, 85° Yellow, 111°	P. ct. 81–85	285–296	Per cent, Should be trifling.	23–28°C. the extremes.
American Oils.						
Kimball	Pale yellow. Solid in 2½ or 3 hours.	58°	88·27	295·1	8·33	21–23
Cooper, First Pressing		81°	88·69	294·2	1·51	20–22
Cooper, Second Pressing.		73°	88·09	295·3	2·96	19–22
Foreign Oils.						
Mottet	Pale yellow. Solid in two hours.	85°	80·13	294·2	0·97	26–28
Rae, Finest Sublime		79°	81·31	291·7	0·69	25·5–27
Rae, Sublime.		84°	83·45	292·0	1·09	25–27
Lucca		86°	85·88	292·5	1·09	25–26
Other Oils.						
Salad	Yellow fluid, with very slight deposit.	69°	104·51	294·5	2·92	30–32
Cotton-seed		82°	....	286·5	0·14	36–38

4. A higher percentage of free acid; to this is due the discordant figures gotten for the temperature-turbidity, but by an examination of these figures it appears that every per cent. of free acid in the oil reduces the temperature about 3° C.; if such a correction be made, figures near 85 are gotten.

5. A higher iodine-absorption for the native oil; this is very probably due to the presence of more olein than in the European oils, the melting point of the fatty acids also indicating this. There is another instance known, similar to this one, in which it has been proven that American fats differ in important respects from the same European fats; refererence is made to lard. American lard has an iodine-absorption of from 60 to 62 per cent., English lard from 51.5 to 62 per cent. (Am. Jour. of Pharm., 1888, 574 and 578.) From such results it would appear that climate and soil modify considerably the composition of the fats and oils, and for such variations due allowance must be made.

6. The fatty acids of the American oils at a temperature of 20° C. are viscid fluids containing suspended the higher melting acids; the European oils are solid at this temperature. Under the microscope,

the former shows the same structure, long prisms, but the European oils differ considerably in appearance—a globular form predominating; they all polarize light.

For the examination of olive oil, the specific gravity, elaidin-reaction, iodine-absorption and fusing point of the fatty acids should be considered; in an adulterated oil all of these tests will tend to confirm the adulteration and will give valuable clues to the nature of the adulterant.

EXPRESSED OIL OF ALMONDS.

By George M. Beringer, Ph. G.

Read at the Pharmaceutical Meeting, April 16.

The examination of a number of samples of oil of almonds was undertaken by the writer with a two-fold object in view; first, to determine the purity of the commercial oils, and, secondly, to satisfy myself as to the value of the requirements and tests of the United States and German Pharmacopœias. The samples of oil examined were obtained from prominent dealers in New York and Philadelphia (most of them being samples of products offered for sale), and as received they varied in amount from two fluid drachms in one case, to a pint in several. The oils examined are believed to represent those now in the market.

For comparison, samples of pure oil were prepared by extracting bitter and sweet almonds with petroleum ether. The bitter yielded 46 per cent.; the sweet 50 per cent. It was intended also to prepare a sample of peach-kernel oil, but I could not at this time procure the kernels. I regret that the samples in most cases were so small that they were insufficient to permit of the application of a number of tests.

Specific Gravity.—The U. S. Pharmacopœia states the specific gravity at ·914 to ·920. The German Pharmacopœia as ·915 to ·920. The British Pharmacopœia is silent as to specific gravity, and gives, likewise, no tests. Watts' dictionary quotes Cloëz as authority for its statement of ·91844. Gmelin, vol. xvii., 92, gives the following: ·911 (Brandes); ·917 (Brisson); ·918 at 15° (Schübler). Allen (Commercial Organic Analysis, vol. ii) states the specific gravity as ·914 to ·918. Brannt (Animal and Vegetable Fats and Oils) places it at ·917 at 68° F., and ·919 at 59° F. Bornemann (Die fetten Oele) gives ·917 to ·920 at 15° C.

The specific gravities of the samples were carefully taken at 60° F., using, where the sample permitted, a 50-gm. bottle; where the sample was small a 10 gm. bottle was used.

The following table exhibits the gravities and physical characters of the samples:

	Sp.Gr.	Color.	Odor and Taste.
1....	.9172...	Pale yellow, nearly colorless.	Bland, mild nutty.
2....	.9195...	Bright yellow.............	Very marked nutty flavor.
3....	.91855.	Very light yellow........... ...	Bland, mild nutty.
4....	.9191..	Light yellow......................	Bland, mild nutty.
5....	.92195.	Light yellow......................	Decidedly nutty.
6....	.9165...	Pale yellow........................	Bland, mild nutty.
7....	.9207...	Light yellow......................	Mild nutty.
8....	.9198...	Bright yellow.....................	Decidedly nutty.
9....	....	Pale yellow........................	Bland, faint nutty.
10....	.9220...	Light yellow.............	Faint nutty, bland.
11....	9186...	Pale yellow, nearly colorless.	Bland, hardly nutty.
12....	.9181...	Light yellow..................	Slight nutty, evidently expressed from moist almonds, as the odor of vol. oil is perceptible.
13....	.9167...	Yellow............................	Extracted from bitter almonds by petroleum ether, hardly nutty.
14....	9169 ..	Yellow...........................	Extracted from sweet almonds by petroleum ether, hardly nutty.

As from the tests, numbers 1, 3 and 12 of the commercial samples are believed to be pure, and with numbers 13 and 14 prepared by myself, showing a range of gravity from .9167 to.9185, it is believed that the officinal limit might be still further narrowed by fixing the gravity at .916 to .919 and usually about ·918.

Solubility.—Considerable discrepancy exists in the various statements regarding the solubility. The U. S. Pharmacopœia describes almond oil as slightly soluble in alcohol. Gmelin's Chemistry (vol. xvii, 93) states "almond oil dissolves in about 25 parts of cold and 6 parts of hot alcohol, (Pfaff); according to Brande it dissolves very slightly in alcohol of 0.82 sp. gr. Storer's Dictionary of Solubilities says, "soluble in 25 parts of cold and 6 parts of boiling alcohol. 1000 drops of alcohol of .823 dissolve 3 drops of it at 12.5° (Schubarth's Tech. Chem.)." Allen (Commercial Organic Analysis, vol. II) says "soluble in 6 parts of boiling and 24 parts of cold alcohol." Brannt (Animal and Vegetable Fats & Oils) states "soluble in 60 parts of cold and 15 parts of boiling alcohol." The earlier editions of the National Dispensatory stated "soluble in about 30 parts of absolute alcohol," which statement, although probably correct, has been omitted in the recent editions. My own experiments lead to the following statement: On mixing one part of oil of almonds with four parts of absolute alcohol and immersing the test tube in the water-bath a perfectly clear solution is obtained. It required 34 parts of cold absolute alcohol at the temperature of the atmosphere (about 70° F.) to make a perfect solution. With alcohol of .820 sp. gr., 42 parts were required to make a solution at the boiling point.

Color Reactions.—The U. S. P. gives only the reaction with sulphuric acid. While this test may serve to indicate the adulteration with cottonseed, sesame, peanut, rape and poppy oils, it would not indicate the admixture of lard or olive oils or the entire sophistication by peach or apricot kernel oils. The Ger. Ph. introduces the following test "when 15 parts of the oil are thoroughly shaken with a mixture of 2 parts of water and 3 parts of fuming nitric acid, a whitish mixture free from red or brown color should be formed which should separate after several hours into a firm white mass and a nearly colorless liquid. This test will serve to indicate adulterations with peach kernel, apricot kernel, sesame, and peanut oil if present in considerable quantity.

The reaction with an equal volume of hydrochloric acid and a fragment of sugar is a very delicate test for sesame oil, the acid liquid separating of a bright red color gradually assuming a purplish tint.

While testing these oils with this test it was observed by the writer that on agitating several of the samples with an equal volume of pure hydrochloric acid (sp. gr. 1.2) the oil became white and the acid separated assuming in a few minutes a bright emerald green color. Thinking that this might possibly be due to some metallic impurities in the oil the acid liquid was separated and tested for metals with a negative result. A number of pure oils were examined to determine the cause of the reaction, but none of them would give similar results. Various mixtures of pure oils were tried and from these the conclusion was derived that the reaction noted was due to a mixture of arachis and sesame oils. Pure arachis oil gives no reaction with hydrochloric acid, while sesame oil gradually assumes a reddish color and the acid becoming also of a faint reddish tint. That a mixture of these oils should produce this reaction has I believe not before been observed. Oxygen seems to be necessary to the reaction and it is noticeable that with rancid oils the reaction is more distinct.

The following table exhibits the color reactions of the oils and also the iodine absorptions.

Oil.	U. S. P. Test. 2 drops H_2SO_4 on 8 drops of oil.	Ger. Ph. Test. 15 parts of Oil, 2 parts H_2O, 3 parts HNO_3 fuming.	⅓ vol. HNO_3 (1.42.)	HCl + sugar	HCl 1.20.	* Iodine Absorption.
N.o. 1.	Yellow, outer edge becoming green, on stirring grayish, almost colorless.	White mixture. In 24 hours oil almost solid white mass, acid liquid colorless.	White, acid colorless	No change.	No change.	96.646
" 2.	Bright brown, turning to reddish brown, on stirring dirty olive brown.	Yellow mixture. In 24 hours oil in two layers, a partly congealed mass, and liq. layer on top, acid bright orange.	Greenish, turning to yellow, acid orange	Red.	Green.	106.260
" 3.	Bright yellow outer edge greenish, on stirring becoming gray, almost colorless.	White mixture. In 24 hours oil almost solid, acid liquid colorless.	White, acid colorless	No change.	No change.	99.176
" 4.	Yellow, on stirring gray, almost colorless.	Peach blossom red. In 24 hours oil partly solidified, acid liquid colorless.	Peach red, acid colorless.	No change.	No change.	99.935
" 5.	Dark brown with black spots, outer edge green, stirring dark olive brown.	Mixture white. After 24 hours oil not solidified, yellow, acid yellow.	Greenish, changing to yellow, acid yellow.	Red.	Green.	106.766
" 6.	Bright orange, on stirring almost colorless.	Peach blossom red. In 24 hours oil almost entirely solidified, white, acid colorless.	Peach red, acid colorless.	No change.	No change.	98.417
" 7.	Brownish yellow, becoming green on outer margin and red through centre, stirring dirty olive.	Reddish, changing to orange. In 24 hours oil yellow, not solidified, acid colorless.	Yellow, acid yellow.	Red.	Green.	106.480
" 8.	Dark red-brown, on stirring an olive brown tint.	Orange mixture. In 24 hours oil yellow, not solidified, acid yellow.	Greenish, changing to yellow, acid yellow.	Red.	Green.	109.802
" 9.	Yellow, outer edge greenish, stirring colorless.	Peach blossom red. In 24 hours oil solidified, acid liquid colorless.	Peach red, colorless.	No change.	No change.	93.989
" 10.	Yellow, becoming darker, on stirring light gray with dark spots.	Yellow. In 24 hours oil yellow, not congealed, acid pale yellowish tint.	Orange red, acid colorless.	Orange.	No change.	105 874
" 11.	Yellow, on stirring gray.	White mixture. In 24 hours oil solid, cream white, acid colorless.	White, acid colorless	No change.	No change.	91.586
" 12.	Yellow, stirring almost colorless.	White mixture. In 24 hours almost solid, acid, colorless.	White, acid colorless	No change.	No change.	96 646
" 13.	Bitter almond, yellow, tinged with green on outer edge, on stirring grayish, yellow tint.	White mixture. In 24 hours solid, acid colorless.	White, acid colorless	No change.	No change.	97 152 98.037 av'ge 97.594
" 14.	Sweet almond, yellow, on stirring bluish gray.	White mixture. In 24 hours almost solid, acid liquid colorless.	White, acid colorless	No change.	No change.	98.928 96.646 97.658 97.744

---

* I am indebted to my friend, Mr. Wm. Beam, for his assistance in taking the iodine equivalents of these oils.

Sample number eleven on heating in a test tube gave the distinctive odor of lard oil, and this will account for its low iodine number.

Of the twelve samples of commercial oil but three answer the requirements of a pure oil; three appear to be peach kernel oil, four are mixtures of sesame and arachis oils, one a mixture of almond and lard oils, and one a purified arachis oil.

ON REFINED TAR OF COMMERCE.

By Clement B. Lowe, Ph. G., M D.

Read at the Pharmaceutical Meeting, April 16.

Mr. McIntyre called the attention of the January Scientific Meeting to the subject of a "Steam Refined Tar," put up by James Good & Co. of this city. He stated that it differed considerably from the tar formerly on the market, and did not make a satisfactory ointment of tar.

I procured a can of the tar in question. On opening it, it was found to contain a considerable quantity of a brown colored water floating upon the tar, which I at first thought might be condensed steam, introduced in the refining process. The tar flowed quite freely, being less viscous than that formerly on the market, and also of a lighter brown color, not granular, but transparent in small quantities, and soluble in alcohol with but little residue, thus excluding the presence of coal tar in any large amount.

I called upon the manufacturers with reference to it, and learned the following particulars:

The tar comes from North Carolina in barrels; when it reaches the factory it is strained through two sieves of different fineness to remove the pine cones, sticks, dirt, etc., which are always present, owing to the carelessness of manufacture; occasionally a barrel will be half filled with a tarry clay. The tar is received into a wooden vat which contains a coil of steam pipe. After running from 100 to 150 barrels of tar through the sieves, about a barrel of sand, etc., will accumulate at the bottom of the vat and will have to be removed. It was distinctly stated, (and I believe the statement to be true) that there were no openings in the steam pipe contained in the vat, the only use made of it being to liquefy the tar so that it can be easily run into the cans.

Mr. Good explained the presence of the water found in the barrels of tar, by saying that frequently the barrels after being filled in North Carolina are rolled into the creeks to swell the staves, that then some of the tar leaks out, and the water takes its place. He also stated that at ordinary temperatures the tar and water in the vat would remain mixed, but at the temperature to which they are heated, which is below the point at which the oil of tar would be driven off, they separate and the water rises to the top. No coal tar is added, its cost being equal to, or greater than that of tar, and its presence being easily detected by taste and smell.

The color of tar varies; at different times of the year it seems to run lighter in color and thinner. The amber tar is preferred by some, especially the manilla rope manufacturers.

Mr. Good seems to think that the tar which he is supplying is of a better quality than that formerly on the market. I suggested to him that his label was misleading and that it would be better to change it to "tar refined by steam heat."

In an interview since had with Mr. Edwin H. Rowley, who has been for many years one of the largest dealers in tar and its products in this city. he states that the color of the tar depends altogether upon the mode of its manufacture. When the drafts are so shut off that the combustion proceeds slowly, then the tar resulting therefrom will be of an amber color, of less density, and contain more oil of tar. But if the combustion is forced the wood will be carbonized to a greater extent, and the tar will be of a darker color and thicker. He considers the amber-colored tar of superior value. In distilling the oil from the tar, water first comes over, then the oil of tar which is collected and sold under the name of spirits of tar, and finally a product which is very thick, oily, and chills easily, for which there is little sale. He states that much of the oil of tar on the market is a solution of tar in rosin oil naphtha, and should not be used for medicinal purposes.

Mr. R. also stated that the presence of water in the barrels of tar originates from want of care in manufacturing the tar and filling the barrels. The tar produced by the slow combustion of the wood runs into a shallow ditch which leads into a pit dug in the sand; there it often remains uncovered, and exposed to storms; when the barrels are filled but little care is taken to separate the water. When a barrel containing tar is placed in the water, the staves swell so that the tar cannot get out or the water in. Large quantities of tar are brought from Wilmington, N. C., upon lumber rafts, the lower tier of the barrels being often partly under water, thus causing to some extent the popular impression.

CLEANING OF MORTARS AND GRADUATES.

By Hans M. Wilder.

Read at the Pharmaceutical Meeting, April 16th.

Mr. Meyer's remarks at the last meeting, about the mischief occasionally caused by using mortars which have been imperfectly cleaned, makes me think that a "wrinkle" I was taught in my apprenticeship days may be of use, especially to my younger colleagues. When I have cleaned my graduates, mortars, etc., thoroughly—at least judging from the appearance—I am in the habit of catching the last drop of the final rinsing water on my tongue, and also taking a strong sniff. In this way the last trace of any acrid, bitter or odorous substance is easily detected, in which case, of course, the washing or rinsing is continued. If substances with marked chemical reactions have been in the graduates or mortars (for instance salicylic acid, tannin, iron compounds, etc.), I use a few drops of an appropriate reagent in order to make sure of the absence of even traces. When cleaning the scale-pan, used in weighing out aniline colors, I always apply at the very last, a few drops of alcohol to the apparently thoroughly clean pan, when the merest speck of aniline color present will reveal itself instantly.

The idea of keeping separate mortars and utensils for poisons, strongly odorous and bitter substances is a good one, provided the utensils be marked unmistakably and kept in a separate place. In my store I was in the habit of keeping separate graduates for tinctures of valerian, asafœtida and spirit of peppermint, which graduates were put behind the respective shelf bottles on a small tray or a piece of hatter's felt.

BISMUTH OXYIODIDE.

By Frank X. Moerk, Ph. G.

The last issue of the American Journal of Pharmacy contains the thesis of Mr. Chas. E. Greene upon the subject "Bismuthyl Iodide," in which said writer comments upon two papers published by me. Regarding these comments, answer could be made, but, in view of the fact that the Am. Jour. of Pharm., 1888, 385, contains a third article by me in which after the first two papers "touched the extremes" I must have covered "the happy medium," there can be no object in replying. This last paper is entirely ignored by Mr. Greene, although it certainly would have been of value to him not only for the preparation of the oxyiodide but also for the composition of bismuth subnitrate.

I have examined the process of Mr. Greene and will call attention to a few points: In making his calculations, the formula for the subnitrate is given as $BiONO_3H_2O$. As the commercial salt invariably contains bismuth oxide, the solution in nitric acid will contain more $Bi(NO_3)_3$ than can be decomposed by the KI used, hence, should the product require all of the KI there is danger of oxynitrate being precipitated with the oxyiodide. Again, the free nitric acid will under the most favorable conditions keep in solution considerable bismuth nitrate, possibly the above excessive amount; under unfavorable conditions iodine may be liberated and thus loss entailed in either case.

In following his directions, after the addition of the KI solution to the diluted bismuth solution, and warming the evolution of iodine vapors occurred, on immersing a thermometer the temperature 60° C. was registered. A second experiment confirmed this; the temperature given in the paper is 80-85°. If this decomposition takes place the product is washed with difficulty, the filtrate contains considerable bismuth and iodine. To obtain a specimen for analysis which was not decomposed by excessive heat, another trial was made and this time the temperature kept at 50° for ten minutes; after no further change in color could be noticed, it was filtered, washed, dried and weighed.

The yield was above the theoretical quantity, being 102.1 per cent. instead of 100. The filtrate gave only a cloudiness with $AgNO_3$, but a very decided precipitate with KOH. The preparation, compared with my own, was of almost the same color, a trifle more red, and was, as expected, a little bulkier; on ignition it left 66.80 per cent. Bi_2O_3, pure BiOI should leave 66.36 per cent., which would indicate the following composition: oxyiodide, 97.05 per cent., oxynitrate, 2.95 per. cent. Owing to the variable nature of the subnitrate, there can be no process devised which will require the exact amounts of subnitrate and potassium iodide, hence, in all cases there must be an excess either of the subnitrate or the potassium iodide; the latter is preferred by me because it will prevent contamination with subnitrate, and allow one to test the completeness of the washing of the oxyiodide. The nitric acid used in my process is so slight after the saturation of the Bi_2O_3 that it will not decompose the slight excess of KI.

It is possible to alter this process so as to include precipitation, by dissolving the subnitrate in nitric acid, diluting largely with water, adding the potassium iodide in dilute solution, adding now sufficient solution of soda so as to leave only a slight acid reaction, and then boiling for one half hour; the boiling is essential, as moderate warming will not complete the reaction. The advantages of this more complicated process are, however, not sufficient to discard the simpler process.

GERANIUM MACULATUM.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 51.

By Henry J. Mayers, Ph. G.

The object in investigating this drug was to ascertain the proximate constituents and determine if it, as has been stated, contains so much as 17 per cent. tannin.

Dr. Edward Staples (A. J. P., 1829, p. 171) found tannic and gallic acids, red coloring, resin, mucilage and a crystallizable vegetable principle.

H. K. Bowman (A. J. P., 1869, p. 193) obtained from two samples 13·41 and 17·25 per cent. of tannin respectively.

For the quantitative analysis the drug was procured from a reliable source in fine powder, and 50 grams taken for the first extractions.

I. Treatment with Petroleum Ether.—This solvent extracted 0·228 per cent.; wax and fat, 0·210 per cent.; volatile oil, a trace.

The wax and fatty matter were of a yellow color, solid at ordinary temperatures, melted at 60° C. Soluble in stronger ether, chloroform and hot 95 per cent. alcohol; the last solvent deposited the wax on cooling, which was of a white color and not crystallizable.

II. Treatment with Stronger Ether.—The drug freed from the previous solvent was exhausted with successive portions of stronger ether.

Total amount dissolved, 0·46 per cent.; resin soluble in alcohol, 0·25 per cent.; gallic acid, 0·21 per cent.

The resin was of a dark brown color and a bitter taste.

The ethereal extract was evaporated and treated with water, the resin separated by filtration and the aqueous filtrate agitated with ether. On separating the ethereal layer and setting aside for 24 hours, crystals of gallic acid of a yellowish color were found to cover the bottom of the beaker. The solution of these crystals in hot water gave no reaction with pure ferrous sulphate, a blue-black precipitate with ferric chloride, no precipitate with tartar emetic or gelatin, and a green color with potassium hydrate changed to red by acids; no tannin was found in the ethereal extract.

III. TREATMENT WITH ABSOLUTE ALCOHOL.—Total amount extracted, 11·40 per cent.; tannin, 2·48 per cent.; decomposed tannin (phlobaphene), 8·92 per cent.; small amounts of sugar and a crystalline principle not estimated.

The aqueous solution of the alcoholic extract gave the following reactions: Solution of ferric chloride, blue-black precipitate; solution of ferrous sulphate, no change; solution of tartar emetic, dark precipitate; solution of gelatin, white flocculent precipitate.

Definite portions of this aqueous solution gave with lead acetate and copper acetate almost exactly the same amount of tannin—2·48 per cent. Petroleum ether and ether extracted from this aqueous solution, made alkaline, a small quantity of a white crystalline body soluble in stronger ether, from which it was recrystallized. This is probably the "crystallizable vegetable principle" mentioned by Staples.

IV. TREATMENT WITH DISTILLED WATER.—Total amount dissolved, 9·54 per cent.; mucilage, 1·12 per cent.; dextrin, 2·58 per cent.; sugar, 5·84 per cent.

V. TREATMENT WITH DILUTE ALKALINE SOLUTION.—Total, 7·52 per cent.; mucilage, 4·64 per cent.; albuminoids, 2·88 per cent.

Dilute acid and chlorine water extracted small quantities, which left, after deducting ash, 57·09 per cent. of cellulose. In separate portions of the drug the moisture was found to be 5·02 per cent., the ash 8·75 per cent.

The amount of tannin found was so low as to demand verifying, which was undertaken by exhausting 10 grams of the drug with boiling water. This decoction, with gelatin and alum solution, indicated 4·25 per cent. This discrepancy not being satisfactory, another portion of the whole drug was purchased, and powdered. In this lot, by the gelatin and alum process, 11·53 per cent. were obtained. These differences in the amount of tannin may be explained by supposing that the two lots of drug were collected at different times in the year, or the first lot, coming from stock kept in the powdered state, had changed; the quantity of phlobaphene, as may be noticed, being excessive.

RESIN FROM FLOWER BUDS OF POPULUS TREMULOIDES.

By Robert Glenk.

On macerating the coarsely-cut fresh buds with alcohol, a dark amber-colored tincture was obtained, which on concentration by evaporation and pouring into water precipitated a yellowish brown resin with a strong hop-like odor, and melting at 51°C.

It is soluble in glacial acetic acid, acetic ether and amyl alcohol; only slightly soluble in chloroform, ether, carbon disulphide, turpentine and benzol.

In alcoholic solution it has an acid reaction. On adding 1 drop of tincture of chloride of iron to 3 cc. of an alcoholic solution (1–50), a dark green color is produced, and the addition of a solution of chlorinated soda to the alcoholic solution produces a jet black color. It is completely soluble in KOH, 5 per cent., to a brown red solution, and is reprecipitated on the addition of an excess of acid. On oxidizing the solution in 2 per cent. caustic potash a peculiar play of colors was noticed from an emerald to a dark green, then to violet, and after five minutes to a deep carmine red, with a distinct odor of oil of bitter almonds, (due probably to cinnamic acid or some anthracene derivatives).

The resin is not entirely soluble in an excess of water of ammonia even on warming; on filtering and evaporating the filtrate, part of the resin is reprecipitated, while a portion remains soluble in water, and on addition of a neutral solution of ferric chloride to the aqueous solution a brown precipitate is produced which on addition of dilute hydrochloric acid is changed to a light yellow color.

On adding to 1 grain of the powdered resin 1 cc. of fuming nitric acid, a dark green solution is formed, afterward changing to dark brown, reprecipitated on adding water. With H_2SO_4 specific gravity, 1.82, a dark red solution is formed which is precipitated on adding water. With HCl specific gravity, 1.160, no change; and with a solution of bromine in chloroform (1-20) no change was observed.

Heated on platinum foil the resin burns and leaves but a minute residue of Na_2CO_3.

Picrotoxin is recommended as an antidote for morphine by Prof. A. Bokai (*Internat. Klin. Rndsch.* Jan., 1889). It is a powerful stimulant to the vaso-motor centre, and may reduce the danger of asphyxia in chloroform narcosis if a small dose be previously administered.

ON TINCTURES.

Abstracts from Theses.

Tinctura Cantharidis.—Rob. A. Hatcher proposes maceration for preparing this tincture. He found that if prepared by percolation a small amount of cantharidin may remain behind in the powder, which can be extracted by the process of Mortreux, viz.: exhausting with chloroform, treating the extract with carbon disulphide, and crystallizing the undissolved portion from chloroform.

Tinctura Catechu composita.—F. B. Quackenbush observed a difficulty in percolating the mixed powders of catechu and cinnamon; if much finer than No. 40, as directed by the Pharmacopœia, the powder would form a solid cake which could not be properly exhausted with the requisite menstruum. This was, however, accomplished by passing the powder through a sieve several times while moistening it.

Tinctura Ferri chloridi.—Griffith R. Lewis again directs attention to the reducing action of alcohol upon ferric chloride, and suggests that the alcohol be replaced by water as previously suggested by Professor Attfield. The generation of ferrous salt was shown qualitatively, no quantitative determinations having been made.

Tinctura Kino was found by F. B. Quackenbush to filter very slowly if prepared according to pharmacopœial directions; but after prolonging the maceration to five days, the subsequent filtration was accomplished in less than one-fourth the time.

Tinctura Nucis Vomicæ.—Of twelve samples of this tincture examined by Edmund H. Watkins, one was whitish and opaque; two were of a distinct reddish tint, while the others varied from a light yellow to dark yellow. The percentage of extract obtained on evaporation was $\frac{3}{4}$, $1\frac{1}{2}$, 2 (three samples), $2\frac{1}{4}$ (two samples), $2\frac{1}{2}$ (two samples), $2\frac{3}{4}$, 3 and $3\frac{3}{4}$. The alcoholic strength of the menstruum was not determined, nor was it ascertained whether the extracts corresponded with that of the Pharmacopœia.

Tinctura Opii.—Arthur M. Leine examined twelve samples, by evaporating the alcohol, shaking with ether, filtering, precipitating with ammonia, washing with ether and drying. One sample obtained from a country grocery store, yielded only ·28 per cent. of morphine. The remaining samples yielded respectively 1·4, 1·2, ·96, ·80, ·76, ·70, ·68, ·65, ·60, ·54 and ·46 per cent. of morphine. The weakest samples appear to have been made of half strength for the purpose of retailing.

Tinctura Opii deodorata.—Wm. H. S. Bateman proposes a modification of the pharmacopœial process as follows: Percolate powdered opium, 10 parts, with stronger ether 28 parts; dry the powder; digest it for two hours at 175° F. (80° C.) with water 40 parts; repeat this operation twice; mix the expressed liquids, evaporate to 60 parts; filter; wash the filter with water to obtain 80 parts of filtrate and add alcohol 20 parts.

Tinctura Scillæ produces a precipitate which may be prevented, according to F. B. Quackenbush, by putting quite a quantity of cotton in the neck of the percolator.

Tinctura Vanillae.—The labor of powdering the vanilla is much lessened by the use of a small proportion of coarse sand previously sifted and washed. F. B. Quackenbush believes that maceration brings out the flavor better than percolation, and that the longer the maceration proceeds, the more delicate will be the aroma of the tincture.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the American Journal of Pharmacy.

The use of cold in the preparation of extracts.—In a communication to the *Société Chimique*, M. Adrian describes his process, which may be stated as follows: The ordinary vegetable preparation (maceration or decoction) is filtered with pressure and placed in a cooling machine where it is subjected to a temperature of —10° C., [+14° F.]. The congealed blocks are then crushed and placed in a rapidly acting essorage apparatus which separates, in a solid state, about 75 per cent. of the water, deprived of nearly all of its soluble principles. The fluid extract thus obtained is again congealed at a lower temperature and the rest of the previous process repeated. The product consists of a highly concentrated syrupy extract equal to 12 to 15 per cent. of the original liquid, which may now be evaporated to any desired degree *in vacuo*. These extracts are not so dark in color as those made by the usual processes, they give clearer solutions, and they present in the highest degree the organaleptic character of the substances which have furnished them. The editor of *L' Union Pharm.* (*March*) from which these details are taken, will soon present the results of experiments and analyses made upon extracts made by this process.[1]

EXALGINE OR ORTHOMETHYLACETANILIDE.—Messrs. Dujardin-Beaumetz and Bardet find that the effects of this substance bear a strong resemblance to those obtained from antipyrine; but exalgine acts more decidedly upon the sensibility and less upon the nervous centres. Therapeutically, the analgesic effects of exalgine may be obtained in single doses of 25 cgm. to 40 cgm; or, from 40 cgm. to 75 cgm. may be taken daily in two doses. The analgesic action appears to be superior to that obtained from antipyrine, even in all forms of neuralgia, visceral neuralgia included. We have not observed, say the authors, any gastric or intestinal irritation, rash or cyanosis as following its use. Exalgine is eliminated by the kidneys and diminishes the amount of sugar in the urine. It is antiseptic, antithermic and analgesic, the latter action predominating. *Nouv. Rem.*, March 24

SALICYLATES OF THE CRESOLS.—These salts may be prepared from ortho, meta or para cresol by a process similar to that used in the making of salol. They are insoluble in water, slightly soluble in cold alcohol, and are easily crystallized. M. Nencki states that they decompose in the economy, where they exert an antiseptic power equal to that of salol, without producing toxic effects. M. Sahli is quoted as saying: "When a considerable dose of antiseptic substance is to be introduced into the digestive tract, the salicylates of ortho or para cresol should have the preference over salol." The same writer prefers these salts to salol in articular rheumatism and vesical maladies. —*Comptes rend.*, Feb. 4; *Répert. de Phar.*, March 10.

DOSES OF SULPHONAL.—In a long study of sulphonal, *Bull. gén. de Thérap.*, March 15, M. Egasse gives the doses as follows: For children, 15 to 25 cgm., two hours before bed-time. For women, 1 to 2 gm.; and for men, 2 to 5 gm., daily, either fractionally, or, as seems preferable, in massive doses, given during a meal, or two hours before the hour for sleep. It is best given, finely pulverized, in capsules, but may be held for some time in suspension in dense mucilaginous mixtures. It may also be given in wine or milk.

---

[1] The process of preparing extracts by cold was described by Professor Alfonso Herrera of Mexico, in AMER. JOUR. PHAR. 1877 pp. 437–440. Mr. Adrian's improvements consist in the use of a centrifugal apparatus for separating the concentrated solution from the ice, and in finally evaporating in vacuo. Prof. Herrera proposed such preparations to be called opopycnols.—Editor.

THEINE USED HYPODERMICALLY.—In chronic neuralgia and rheumatism, Dr. F. J. Mays prescribes theine in hypodermic injections of doses varying from 2 to 6 cgm. He recommends the following formula: Theine and benzoate of sodium, $\bar{a}\bar{a}$ 3·75 gm.; chloride of sodium, 50 cgm., aq. dest., 30 gm. Of this solution, 0·36 gm. contains 0·03 of theine.—*J. de Ph. et de Ch.*, Feb. 1.

COLLYRIA OF BORATES OF THE ALKALOIDS.—Messrs. Petit and Galezowski find these useful as preventing the local irritation often caused by the use of alkaloidal acid salts. The alkaloid, such as eserine, pilocarpine, atropine, hyoscyamine and cocaine, is first dissolved in a small quantity of alcohol. Then a quantity of boric acid equal to twice the weight of the alkaloid is dissolved in alcohol and the solutions are united. The mixture is then evaporated to dryness. An excess of boric acid is not injurious.—*Nouv. Rem.*, March 24.

ALTERATION OF MORPHINE IN AQUEOUS SOLUTION.—Dr. Lamal finds that pure salts of morphine in distilled water are unalterable if kept from the action of light and dust. Cloudy solutions arise from the development of micro-organisms. The yellow coloration, acid reaction and formation of crystals, are due to the action of light and of organic ferments. The color arises from the transformation of morphine into an amorphous substance which appears to be morphetine. The crystals are caused by oxidation of the salt. The acid reaction is due to morphetine and the salts of oxymorphine[1]. Apomorphine is not formed in aqueous solutions of morphine. In the blood and tissues, morphine is partly transformed into oxymorphine, which is eliminated by the urine; but morphine, as such, may be found there. In organic researches for morphine, oxymorphine should be sought for as a first product of oxidation.—*Bull. de l' Acad. de Belg.; J. de Ph. et de Ch.*, Feb. 15.

OLEIC ACID ADULTERATIONS.—According to Granval and Valser linoleic acid—made from linseed oil by saponification—is used commercially for this purpose. The authors state that if a thin coating of the sophisticated oil be applied to a smoothly scraped lead plate, and exposed for twelve hours to the air, it will become gummified, while pure oleic acid remains, under like circumstances, nearly unchanged. Or, a small quantity of the suspected oil may be mixed with an equal amount of soda-lye. If linoleic acid be present an intense yellow color is produced; if the oleic acid be pure, the reaction is of a gray color.—*Jour. de Ph. et de Chim.*, March 1.

---

[1] That solutions of acetate of morphine may yield crystals of morphine was shown in AMER. JOURNAL OF PHARMACY, 1871, p. 50.—EDITOR.

Raisin Wine.—M. Palangié recommends the following formula: Corinth raisins, 25k.; sugar, 4k.; fresh grapes, 1k.; tartaric acid, 25 gm. Exhaust the raisins with three waters; press and unite all the liquors in a cask. Dissolve the sugar and tartaric acid in water and boil for a few minutes; add this to the other liquors, with water to make a hectoliter; then add the grapes, previously bruised, and keep the mixture at a temperature of 77°F. In 48 hours from the beginning of fermentation the air in the cask must be renewed, and this must be repeated daily until fermentation ceases. The wine should stand for a month before bottling.—*Jour. de Phar. et de Chim.*, March 15.

Preservation of Colored Anatomical Specimens.—Alcohol changes, and often destroys, the coloring matters of these objects. Mr. Fabre-Domergue proposes a syrup in accordance with the following formula: Syrup of glucose, of 25° B. (specific gravity, 1·210), 1000 gm.; white glycerin, 100 gm.; methylic alcohol, 200 gm.; camphor, q. s. The glucose is dissolved in hot water; after cooling, the other articles are added, with "a few pinches" of powdered camphor. The liquor should be neutralized with a little soda or potash lye; it should then be filtered and a little camphor should be dusted over the surface.—*Nouv. Rem.*, March 24.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Mœrk, Ph. G.

Blue litmus paper made by neutralizing an aqueous solution of litmus with phosphoric acid is liable to wrongly indicate the reaction of some solutions; the aqueous solution of litmus in addition to the potassium salt of the coloring matter contains the carbonates of potassium and ammonium, which, with phosphoric acid, form the acid salts, K_2HPO_4 and $(NH_4)_2HPO_4$, with alkaline reactions, and certain quantities of phosphoric acid can be added to solutions of these salts without the production of an acid reaction; such a paper brought in contact with *neutral* solutions of Ca, Ba, Sr and Ag invariably indicates an acid reaction due to formation of acid phosphates of these metals, which have acid reactions, or of free phosphoric acid. To obtain a sensitive litmus paper recourse must be taken to some other mineral acid, preferably HCl. The following method furnishes litmus paper which easily indicates alkalinity, as KOH, in 1 : 20000; acidity, as HCl, 1 : 50000; 100 gms. litmus in cubes are triturated with 40 gms. water to form a paste, which is then rinsed into a flask with 960 gms. water, agitated repeatedly during six hours, allowed to stand a few days, filtered and washed with water to make 1000 gms.; to the filtrate add 5 gms. hydrochloric acid, warm on a water-bath to expel CO_2, and, in case the blue color reappears, add HCl drop by drop until a permanent red color results, evaporate to 900 gms. and divide into two portions. To one portion add lime water until the liquid becomes wine-red in color; through this solution pass strips of neutral filter paper, should the latter be acid in reaction wet with dilute ammonia water and dry; the test paper is of a wine-red color and of the above degree of sensitiveness. To the other portion add carefully, first, a few drops of solution of potash and then lime water until a strip of paper moistened with the solution on drying just appears blue. The blue paper is not changed by silver nitrate or the neutral compounds of Ba, Sr and Ca precipitated ferrous sulphate merely imparts a red-violet color; a solution of lead acetate does not affect the paper but very often this chemical will show an alkaline reaction due to loss of acetic acid.—E. Utescher, *Apoth. Ztg.*, 1889, 279.

Adeps benzoatus is best prepared by dissolving one part true sublimed benzoic acid in one hundred parts melted lard; such a preparation possesses a finer appearance, more pleasant odor, less reducing action (on salts of silver), is of uniform quality and keeps as well as the preparation made with benzoin.—E. Utescher, *Apoth. Ztg.*, 1889, 280.

Myrtle oil and myrtol have recently been examined by E. Jahns prompted by their increased use in affections of the respiratory organs and the bladder. The myrtle oil of Spanish origin (in contra distinction of a Corsican oil which is also found in commerce distinguishable by a finer odor) is of a light yellow color, is dextrogyre and has, at 10° C., the specific gravity 0·910. It commences to boil at 160° and fractioned, eighty per cent. distil over below 240°, the residue is stated to consist of resinified and polymerized terpenes. From the different fractions between 160° and 240° were isolated 1, a terpene, very probably dextrogyre-pinene, boiling at 158—160°; 2, Cineol

$C_{10}H_{18}O$ boiling at 176°, this could not be obtained pure simply by fractional distillation but by application of Wallach's method (passing dry HCl through the chilled fraction, draining the crystalline magma, decomposing this with water, warming with dilute KOH, washing the separated oil with water, drying and distilling over metallic sodium) it was obtained ; 3, a camphor-like body boiling between 195 and 200° which could not be isolated perfectly pure, but its behavior towards metallic sodium and the results of an ultimate analysis point towards the formula $C_{10}H_{16}O$. The so-called *myrtol* was found to be a mixture of dextrogyre-pinene and cineol and is more appropriately called *rectified myrtle oil.* The use of myrtol is recommended to be discontinued, giving way to eucalyptol identical with cineol ; the presence of the terpene and the irritating effect of this substance on the respiratory organs being the cause for the above suggestion.—*Arch. der Pharm.*, 1889, 174.

Mercurial ointment is made by G. Greuel by triturating 100 gms. mercury with 15 grams *anhydrous* lanolin, containing 20 per cent. olive oil, until the mercury is extinguished under a lense magnifying 5 diameters, and incorporating with an *anhydrous* semi-fluid mixture of 115 gms. lard and 70 gms. mutton suet. The success of the method depends upon using material entirely free from water; one kilogram ointment can be made in from one to one and a half hours. —*Pharm. Centralhalle*, 1889, 127.

Cinchona-liquor of beautiful color, pleasant bitter taste and aromatic odor is prepared as follows: Cinchona bark 600, fresh orange peel 350, fresh Curaçoa peel, free from parenchyma, 150, gentian 180, cinnamon 100, cloves 1, cardamom 0.8 are macerated with white wine 2250 and alcohol (96 per cent.) 3500; rock candy 3100 is dissolved with heat in water 1500 and, after cooling, mixed with the vinous liquid, allowed to stand two days and filtered.—Rolffs, *Pharm. Ztg.*, 1889, 166.

To remedy rancidity in oils, H. Hager uses alcohol of 85–87 per cent., which by dissolving the free fatty acids renders the oil again sweet and fit for use; one volume of the oil warmed to 35° C. is thoroughly and repeatedly agitated during twelve hours with one to one and a-quarter volumes of alcohol, allowed to separate and the upper (alcoholic) layer removed. The oil is shaken a second and, if necessary, a third time with half a volume alcohol; proceeding as above from a rancid olive oil (six to eight years old) 0·86 per cent. free fatty acids were obtained; the alcohol can be recovered by distillation making the process a cheap one. Of a large number of oils examined, castor oil alone could not be purified in this manner, owing to its affinity for alcohol; with alcohol of more than 50 per cent. this oil increases in volume and the alcohol dissolved is removed with considerable difficulty. There are some oils in which the free fatty acids are desirable, as cod liver oil, croton oil and the fixed oil of laurel, to which the process is not applicable.—*Pharm. Ztg.*, 1889, 192.

Extractum Glycyrrhizæ.—Kremel (*Pharm. Post*, 1889, 194) states that the solubility of this preparation is not a sufficient test of purity and advises determinations of the glycyrrhizin and the ash. It has been found that the ash of the unadulterated extract is always strongly alkaline. The glycyrrhizin is estimated by taking 5 gms. coarsely powdered extract and 50 cc. water, allowing to stand for several hours with frequent stirring, adding, after solution, 50 cc. of 90 per cent. alcohol which materially assists filtration, allowing to subside and filtering through a plaited filter. The filter is well washed with 40 per cent. alcohol and the alcohol removed from the filtrate by heating on a water-bath; after cooling, the glycyrrhizin is precipitated with sulphuric acid, collected on a small filter, washed with water and dissolved off the filter by carefully dropping on ammonia water; the filtrate is collected in a small tared beaker or capsule, evaporated on a water-bath and finally dried at 100° and weighed.

	1	2	3	4	5
Glycyrrhizin	5·88	8·06	8·30	9·75	11·90
Ash	2·90	6·44	5·64	8·64	5·64

The ash of 1 was neutral in reaction and the percentage of glycyrrhizin so low as to be suspicious.

Sodium bicarbonate of English manufacture is chiefly made by the ammonia-soda process and contains ammonium salts in varying amounts; attention is called to the fact that ammonium salts interfere seriously with the mercuric chloride test for the normal carbonate, a white precipitate of mercurammonium chloride appearing first and only after fifteen to thirty minutes the red precipitate characteristic of the carbonate.—C. Arnold, *Pharm Ztg.*, 1889, 198.

Medicinal cod liver oil is examined for iodine by mixing three grams oil with two grams dry sodium carbonate, heating to complete carbonization, lixiviating with repeated small portions of boiling water, filtering, concentrating, adding five to six drops fuming nitric acid, and shaking with carbon bisulphide. The iodine can be estimated quantitatively by using $\frac{1}{10}$ normal sodium thiosulphate solution; the averages obtained were for pale oils 0·02 per cent., for yellow oils 0·031 per cent. The acidity is determined by dissolving 2–5 grams oil in 20 cc. ether, adding 15 cc. alcohol and a few drops phenolphthalein and titrating with $\frac{1}{10}$ normal potassium hydrate; the acidity of the ether and alcohol must also be determined and allowed for in the test. The acid present in one gram oil neutralized from 0·002 to 0·0044 gram KOH. The writer recommends that only cod liver oil containing iodine, and whose acidity does not require more than 0·004 gram KOH per gram oil be employed medicinally.—Hugo Andres, *Pharm. Ztschr.* f. Russl., 1889, 145.

Mercuric salicylate can be made by precipitation as follows: Dissolve two grams mercuric oxide in acetic acid diluted with a little water by application of heat, dilute to 200 cc., add a solution of sodium salicylate (about 3·13 grams) until precipitation ceases, filter, wash precipitate with water until washings are no longer affected by H_2S or Fe_2Cl_6; yield three grams. The product is a white amorphous powder, soluble in solution of sodium chloride.—C. Goepel, *Pharm. Ztg.*, 1889, 206.

Guaiacol should constitute an oily, refractive, when freshly distilled, colorless liquid, of pleasant aromatic odor, sp. gr. 1·117, slightly soluble in water 1:1000, easily soluble in alcohol and ether. 2 cc. each of guaiacol and solution of soda (sp. gr. 1·30) evolve considerable heat when mixed, and on cooling form a white crystalline solid mass. 5 cc. guaiacol, agitated with 10 cc. glycerin (sp. gr. 1·19), should not be decreased in volume. 2 cc. guaiacol, 4 cc. benzin, and a few drops of water, cause an immediate separation of the guaiacol. An aqueous solution with Fe_2Cl_6 gives first a yellowish, afterwards a pure brown color. Three drops of guaiacol, dissolved in 5 cc. absolute alcohol, with a very dilute Fe_2Cl_6 solution, gives first a blue solution, changing at once to green.—(*Pharm. Weekbl.*), *Apoth. Ztg.*, 1889, 324.

Glucose in milk sugar.—To detect even traces, H. Will agitates for one minute 10 grams powdered milk sugar with 20 cc. dilute alcohol, filters and heats to the boiling point, for a few seconds, 5 cc. of the filtrate with 5 cc. of a solution made from 7 grams cupric acetate, 87 cc. water, and 3.2 cc. dilute acetic acid; the test, in *absence* of glucose remains clear on cooling, and after one hour's standing should show no deposit of cuprous oxide.—*Apoth. Ztg.*, 1889, 324.

Sodium salicylate solutions after a short time develop a red color, rendering them unfit for use. This decomposition takes place especially in alkaline solution; a fresh solution of sodium salicylate has a slightly acid reaction; but this reaction, especially in concentrated solutions, is destroyed, and instead an alkaline reaction appears, dependent upon which is the depth of color of the solution. S. Demant gives the following formula for a 20 per cent. solution, which remains unchanged for months; its stability is due to a slight excess of salicylic acid, which in no way interferes with its action: 400 parts distilled water are heated to the boiling point, allowed to cool to 30° C., 100 parts salicylic acid added, and then 60 parts bicarbonate of sodium introduced, in small portions, with constant stirring, the solution is filtered through absorbent cotton and diluted with sufficient distilled water to make 600 parts.—*Oesterr. Ztsch. f. Pharm.*, 1889, 171.

NOTE ON THE DECOMPOSITION OF POTASSIC CHLORATE BY HEAT IN THE PRESENCE OF MANGANIC PEROXIDE.[1]

Having observed the alteration in appearance that peroxide of manganese undergoes when heated with potassic chlorate, the author has made a number of experiments, using different kinds of oxide of manganese, determining the loss of weight that the mixture suffers when heated, and also the quantity of chlorine simultaneously generated. The heating was generally effected by the vapor of boiling mercury, at which temperature the potassic chlorate is not changed. The more finely divided the peroxide, the more rapid is the action and the more chlorine is evolved. When the evolution of chlorine is prevented by the addition of a small quantity of sodic or potassic carbonate, the decomposition of the chlorate proceeds very slowly, unless the temperature be raised much above that of boiling mercury. When potassic chlorate is fused with a minute quantity of peroxide of manganese, the residue is found to be pink on cooling, indicating the presence of a permanganate; and inasmuch as potassic permanganate is decomposed at a temperature of 275°, it is not improbable that the permanganate is decomposed by the heat as rapidly as it is produced into potassic manganate, manganic peroxide, and oxygen; the resulting potassic manganate is acted on by chlorine generated by the action of the peroxide on some fresh chlorate, forming potassic chloride, manganic peroxide, and oxygen, so that the peroxide is being continually reproduced. The quantity of chlorine evolved corresponds to only a very small proportion of the manganic peroxide present, so if the first action really takes place the chlorine must be absorbed and employed in converting the potassium into chloride.

---

[1] Abstract of a paper read before the Chemical Society; reprinted from *Chemical News*, March 1, p. 104.

Discussion.—Professor Thorpe, referring to the well-known fact that no perchlorate is formed in presence of manganese dioxide, asked how this was to be explained.

Mr. Williams stated that he had been unable to obtain the theoretical amount of oxygen from potassium chlorate by heating it *in vacuo;* a gas was given off which attacked mercury—presumably chlorine, and therefore it was probable that the residue contained potassium peroxide. On heating silver iodate *in vacuo* the theoretical amount of oxygen was obtained without difficulty.

Professor McLeod said that he was unable to account for the non-production of perchlorate in presence of manganese dioxide; as potassium perchlorate was not decomposed by heating with manganese dioxide, it probably was not even an ephemeral product. He had without difficulty obtained almost the theoretical amount of oxygen from chlorate. He did not think that the pink color was due to ferrate as had been suggested, as he had found that iron oxide gave a somewhat different color.

Professor Ramsay remarked that Stas, in his determination of the ratio of potassium chloride to oxygen in chlorate, had not found that peroxide was formed.

ESTIMATION OF FREE HYDROCHLORIC ACID IN THE CONTENTS OF THE STOMACH.[1]

By J. Sjöqvist.

The oldest method is that of Bidder and Schmidt, who were the first to prove the existence of free hydrochloric acid in the gastric juice. Rabuteau's method, modified by Cahn and v. Mering (*Deut. Arch. klin. Med.*, xxxix, 239), consists in distilling off the volatile acids and shaking the residue with a large excess of ether which takes up the lactic acid; this is separated, and cinchonine is added to the remainder until the reaction is neutral, then it is shaken four or five times with a large excess of chloroform, which takes up the cinchonine hydrochloride; the chloroform is distilled off, and the chlorine estimated in the residue. Another method devised by Cahn and v. Mering consists in distilling the contents of the stomach with water three times. The volatile fatty acids are estimated in the distillate. The residue is shaken six times with 500 cc. of ether, and this is evaporated to dryness, and the lactic acid estimated by titration. The residue contains the hydrochloric acid, and this also can be estimated by titration.

---

[1] *Zeit. physiol. Chem.*, xii., 1–11; reprinted from *Jour. Chem. Soc.*, March, 1889.

Another method used by Seemann (*Zeit. klin. Med.*, v), and Hebner (*Zeit. anal. Chem.*, xvii, 236), consists in neutralizing the stomach-contents by titrating with sodium hydroxide, evaporating to dryness, and carefully incinerating. The ash is extracted with water, and in the extract the alkali present is estimated by titrating with an acid; the difference between the amount of alkali added, and the amount of alkali found, gives the amount which must have combined with hydrochloric acid.

This method, however, gives too high results; and the other methods take too long, and too large a quantity of the necessary reagents to be available for clinical work.

The method now recommended gives absolutely accurate results, and is sufficiently simple to use clinically. The contents of the stomach are evaporated to dryness with barium carbonate and then incinerated; barium chloride remains unchanged, and the salts of the organic acids are burnt to barium carbonate. The barium chloride is then extracted with water, and the quantity of barium dissolved is a measure of the original amount of free hydrochloric acid. The barium may be estimated by Mohr's titration method. In this method, potassium dichromate is added to the barium solution, by which means a precipitate insoluble in water and acetic acid is formed; the indicator of the end of the reaction is the yellow color which the smallest excess of the dichromate gives to the liquid which floats over the precipitate. A more delicate test for excess of the dichromate is, however, Wurster's tetramethylparaphenylenediamine paper. Potassium dichromate in an acetic acid solution acts in the same way as ozone, to test for which the paper was originally used; it turns it blue.

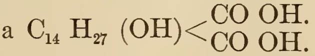
The titration is carried out as follows:—The solution of barium chloride is placed in a beaker, and a quarter of its volume of alcohol added, then a few cc. of a 10 per cent. solution of sodium carbonate containing 10 per cent. of acetic acid. A standard solution of potassium dichromate is then added from a burette till the end-reaction is obtained. Directions are given for the preparation of the standard solution: the most convenient was found to be one of which each cc. corresponded to 4·05 mgrms. of HCl.

The method was tested with known strengths of hydrochloric acid, and mixtures of hydrochloric and lactic acids, and with artificial gastric juice. The results obtained were exceedingly accurate. The paper concludes with the account of the results obtained from actual stomach-contents by the use of the method. These may be summarized as follows:—

Case.	Reactions for HCl.	Reactions for lactic acid.	Percentages.	
			Total acidity.	HCl.
1	Doubtful	Well marked	0·15	0·02
2	Positive	Positive	0·29	0·132
3	"	"	—	0·076
4	"	Doubtful	0·2	0·138
5	"	Positive	0·295	0·144
6	"	Weak	0·189	0·164
7	Negative	Positive	0·14	0·03

ON AGARIC ACID.[1]

By Dr. Hofmeister.

Pure agaric acid is a bibasic triatomic homologue of the malic acid series, having the formula  $C_{14}\,H_{27}\,(OH)<\begin{matrix}CO\ OH.\\CO\ OH.\end{matrix}$ Its solubility is but slight in cold, and fair in boiling water. The neutral alkaline salts dissolve readily, and, like the salts of the higher fatty acids, easily break up in solution into free acid and basic salt.

Locally its action is that of an irritant. Injected under the skin it causes intense pain, inflammation, and suppuration. When swallowed, large doses produce vomiting and diarrhœa. The general action on cold-blooded animals is a gradually progressive central paralysis, weakening of the heart, and suppression, or marked depression of the cutaneous secretion. The only symptoms produced in dogs by large doses administered by the mouth were vomiting and diarrhœa. By subcutaneous and intravenous injections in rabbits, it was found that the vaso-motor and vagus centres were first stimulated and finally paralyzed. Death was caused by failure of respiration, and in animals subjected to artificial respiration, by failure of the heart.

---

[1] *Archiv für experimentelle Pharmakologie*, XXV., Hft. 2; abstract reprinted from *The Medical Chronicle*, March, 1889.

The action of agaric acid on the secretion of sweat was investigated in cats by injecting subcutaneously the soda salt. The results placed beyond a doubt the anti-hydrotic action of the drug. The facts that in an animal under the influence of agaric acid, irritation of the subsciatic nerve had no effect on the secretion of sweat in the corresponding leg, and that this limb sweated profusely some minutes after the injection of pilocarpin, prove that the action is not central but peripheral.

With the exception of the anti-hydrotic effect, there is no similarity between the actions of atropin and agaric acid.

Malic acid and members of the higher fatty acid series were tried, and found to have no influence on the sweat glands.

In regard to the therapeutic use of agaric acid, it is to be noted that the local irritation produced by the drug and its salts forbid the subcutaneous administrations. On the other hand, vomiting and diarrhœa need not be so dreaded when the pure drug is used as the experience of those who have tried the commercial agaricin might lead us to do.

Doses of 0·05, and in one case 0·1, given to phthisical patients caused slight temporary nausea and signs of intoxication. Doses of 0·02 and 0·03 were, without exception, well borne. The anhydrotic effect became first manifest hours after the drug was taken, and lasted for over twenty-four hours. Hence it is possible to get the full benefit of a large dose, and at the same time avoid the unpleasant effects, by repeating small doses at short intervals. The large doses should not be ventured on unless it is quite certain that we are dealing with pure, white, well-crystallized agaric acid, which does not taste bitter when dissolved in weak alcohol, and forms a colorless solution in boiling water.

Cocaine is precipitated by sodium borate, according to Levaillant; the precipitate will disappear on the addition of a few drops of glycerin.—*Archives de Ph.*, Nov. 6, 1888.

THE CONGEALING POINT OF OIL OF ANISE.[1]

By John C. Umney.

The commerce of oil of anise would seem to have changed materially since the time when the editors of the *Pharm. Lond.*, 1851, wrote: "Anise oil is stated to be adulterated with oil of star-anise, which is sometimes sold for that of anise."

At the present time by far the greater portion of anise oil of trade is that of star-anise; indeed, I am informed on very high authority that for every pound of "aniseeds" oil (*Pimpinella Anisum*), one would meet with a thousand pounds or even more of "star-anise" oil (*Illicium anisatum*). That star-anise oil was largely imported as far back as 1838 is certain from reference to a circular issued in that year on the authority of the "Druggists' Club," on the import of drugs (and among them star-anise oil) from China and the East Indies, and the conditions on which they should be sold on entering the Port of London. I have no exact information as to whether the oil was used at that time for pharmaceutical or confectionery purposes. I have learned from my father that it was formerly the custom to mix much of the star-anise oil sold in the Port of London, in large cisterns, which process was termed "working," and according as this had been performed or not the product was sold by brokers as "worked" or "unworked" oil. This manipulation has of late years been looked upon as unnecessary, and I think rightly so, for a recent examination of trade samples obtained from ten London wholesale druggists proves conclusively that unusual uniformity exists, and that "bulking" the oils, whatever may have been the case half a century ago, is now unnecessary (see Table B.).

The author quotes the descriptions of oil of anise as given by the London Pharmacopœia of 1851, the British Pharmacopœias of 1864 and 1885, the United States Pharmacopœia, and by Pharmacographia, and suggests that the statements as to the solidifying points must have been based on one common authority, who, it would seem, fell into an error in its determination.

Before I allude to the changes that take place at the moment at which anise oils solidify, I should like to refer to the well-known fact that some liquids, such, for example, as water, saline solutions, etc., when at absolute rest are capable of being cooled many degrees below their normal point of congelation without becoming solid. But when a liquid solidifies after being cooled below its normal freezing point, the solidification is accompanied by a disengagement of heat, which is sufficient to raise its temperature from the point at which solidification begins up to its *ordinary or true congealing point.* This physical law and its application to anise oils is the key-note of my communication this evening. The solidifying points of star-anise oil hitherto quoted have been *abnormal ones,* due to their determination whilst the fluid was at rest. The *true congealing point* is the temperature to which the thermometer immediately rises, on this solidification taking place. The oil of pimpinella does not present such a marked difference in respect of its *abnormal and true* congealing points, but as I will proceed to show, that of star-anise presents a strange dissimilarity.

---

[1] Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, February 13; reprinted from *Phar. Jour. and Trans.*, Feb. 16, p. 647.

TABLE A.

SOURCE OF OIL.	Abnormal solidifying point.	True solidifying point.	Color reaction with alcoholic HCl.
	Fahr.	Fahr.	
Star-anise (German)............	31	52	Yellowish brown.
Star anise (own distillation).	24	49	Yellowish brown.
Star anise (direct import from Macao, China)...............	34	56	Pale brown.
Star-anise (broker's sample).	36	54	Brown.
Anise fruit (German).	50	59	Manganese pink.
Anise fruit (own distillation)	50	59	Manganese pink (fading quickly).

Table A will, I think, show that the margin allowed by the Pharmacopœia for the pimpinella oil, viz., from 50° to 60° F., is practically the difference between the abnormal and normal solidifying points, and is therefore correct, but that the congealing point quoted for star-anise oil is its *abnormal one,* and is therefore, I think, incorrect. Moreover that between the true or *normal* solidifying points of pimpinella and illicium oils there is practically no difference, and it is only between their *abnormal* congealing points that a wide divergence exists.

How then are we to frame "characters and tests" that will distinguish these oils? Either (1) we must say, that the solidifying point, taken when the liquid is at rest, of "pimpinella" oil is about 50° F., whilst "illicium" oil is about 35° F., *i. e.*, their *abnormal congealing points*, which, to my mind, has the disadvantage of being somewhat unscientific; or,

(2) We must find some easily applied distinguishing test. The one I would suggest is that proposed by Eykmann,[1] which I have found most efficient, viz., a saturated solution of hydrochloric acid gas in absolute alcohol, which reagent affords with "pimpinella" oil a beautiful manganese pink, whilst with "illicium" oil, only a pale brown color is shown, as will be seen by reference to Table A. The test is more strikingly apparent with the "natural" oils, than with oils that have been subjected to rectification, but even in the latter case, it is still sufficiently delicate to admit of no confusion.

In "*Pharmacographia*" 1st edit., page 278, the authors write: "We are unable to give characters by which these oils can be discriminated, although they are distinguished by dealers."

With the authentic specimens, which I have placed on the table, I am convinced there are very few in this room, who possess anything like a delicate olfactory organ, who cannot with ease distinguish between the one and the other; indeed, there may be dealers in this room, who would blindfold, distinguish between aniseeds and star-anise oils.

TABLE B.

(*Indicating Examination of Trade Samples.*)

SAMPLE.	Abnormal solidifying point.	True solidifying point.	Color reaction with alcoholic HCl.
	Fahrenheit.	Fahrenheit.	
No. 1	31	54	Almost colorless.
No. 2	34	53	" "
No. 3	33	53	" "
No. 4	38	54	" "
No. 5	39	57	" "
No. 6	36	54	" "
No. 7	31	54	Yellowish-brown.
No. 8	35	57	Almost colorless.
No. 9	39	58	Yellowish-brown.
No. 10	39	56	Almost colorless.
Average of 10 samples	35·5	55	

The "pimpinella" oil, you will note, has a peculiar fatty smell, quite absent from the "illicium" oil. Part of this peculiar odor is, I am aware, removed commercially by fractional rectification, but even after this process the odor is unmistakable. Summarizing, then, I would suggest that some modification of the characters and tests of the Pharmacopœia be made in future editions, presuming, of course, that the compilers consider it of sufficient importance to distinguish between the two oils. Judging from the text of the present edition, they do think this desirable, and therefore I would suggest the "characters and tests" in the future should embody the points I have raised, and which I trust I have conclusively proved.[1]

---

[1] *Pharm. Journ.*, vol. xi., p. 1046.

SEVENTH DECENNIAL CONVENTION FOR REVISING THE PHARMACOPŒIA OF THE UNITED STATES OF AMERICA.

Notice is hereby given that, in accordance with and by virtue of the authority vested in me by the Convention of 1880, I hereby call upon the several incorporated Medical Societies, incorporated Medical Colleges, incorporated Colleges of Pharmacy, and incorporated Pharmaceutical Societies throughout the United States of America, The American Medical Association, and The American Pharmaceutical Association, to elect a number of delegates, not exceeding *three*, and upon the Surgeon-Ceneral of the Army, Surgeon-General of the Navy, and the Surgeon-General of the Marine Hospital Service to appoint, each, not exceeding *three* medical officers to attend a General Convention for the Revision and Publication of the Pharmacopœia of the United States of America, to assemble in the city of Washington, D. C., on the first Wednesday of May, 1890 (May 7th), at twelve o'clook noon.

The several bodies, as well as the Medical Departments of the Army, Navy and Marine Hospital Service, are hereby requested to submit the Pharmacopœia to a careful revision, and to transmit the result of their labors to the Committee of Revision at least three months before the meeting of the General Convention.

The several Medical and Pharmaceutical bodies are hereby requested to transmit to me, as the President of the Convention of 1880, the names and residences of their respective delegates, as soon as they shall have been appointed; a list of these delegates shall thereupon be published under my authority, for the information of the medical public, in the newspapers and the medical journals in the month of March, 1890.

---

[1] In the discussion following the reading of this paper, it was stated that the rectified oils would not give the same color reaction as the original oils, and that Professor Flückiger had oils of star-anise in his possession congealing at temperatures varying from 50° to 32° F. Allusion was also made to changes possibly occurring on keeping by the partial conversion of crystallizing anethol into uncrystallizing anethol.

In the event of the death, resignation or inability of the President of the Convention of 1880 to act, these duties (in accordance with the resolution of that Convention) shall devolve, successively, in the following order of precedence: Upon the Vice-Presidents, the Secretary, the Asst. Secretary, and the Chairman of the Committee of Revision and Publication of the Pharmacopœia. These officers are as follows: *First Vice-President,* Samuel C. Busey, M. D., of Washington, D. C.; *Second Vice-President,* P. W. Bedford, Ph. G., of New York; Secretary, Frederick A. Castle, M. D., of New York; *Assistant Secretary,* C. H. A. Kleinschmidt, M. D., of Washington, D. C.; *Chairman of Committee of Revision,* Charles Rice, Ph. D., of New York; *First Vice-Chairman of the Committee of Revision,* Joseph P. Remington, Ph. M., of Philadelphia, Pa.; *Second Vice-Chairman of the Committee of Revision,* C. Lewis Diehl, Ph. G., of Louisville, Ky.

At the General Convention held in Washington, D. C., on the fifth day of May, 1880, the organizations and bodies enumerated in the Abstract of the Proceedings of the National Convention of 1880, on pp. xv. to xviii. of the U. S. Pharmacopœia of 1882, were recognized as being entitled to representation.

If any body other than those admitted in 1880 shall desire a representation in the Convention of 1890, it is suggested that the proof of incorporation, signed by the Secretary of State, of the State which shall have issued the charter, or by properly qualified public officials of the United States, be presented with the credentials of the delegation.

A blank form of certificate of appointment of delegates will be sent upon application by letter to my address, care of Dr. Edwin H. Brigham, Assistant Librarian of the Boston Medical Library, 19 Boylston Place, Boston, Mass. (Signed) ROBERT AMORY,

President of the Convention of 1880.

BOSTON, March 9th, 1889.

AMERICAN PHARMACEUTICAL ASSOCIATION.

The thirty-seventh annual meeting of the American Pharmaceutical Association will be held in San Francisco, Monday, June 24th, first session at 3 o'clock P. M.

The California members have repeatedly extended an invitation to the Association to meet in San Francisco, and now that the invitation has been accepted it is earnestly desired that every member will make an effort to attend.

Excursions and round trip tickets at low rates have been arranged for from all points. Full information will be furnished in the usual annual circulars, which will be issued by the Permanent Secretary early in May.

The California State Association has decided to hold its annual meeting at the same time and place with our own, which will largely add to the number and interest of the meeting.

The Exhibition, notwithstanding the great distance and cost of transportation, will be equal to any that has heretofore taken place. The exhibit will be in Odd Fellow's Hall, the same building that the sessions of the Association are held in. For space and all other information application may be made to the local Secretary, Mr. E. W. Runyan, No. 53 Stevenson street, San Francisco.

M. W. Alexander, *President.*

MINUTES OF THE PHARMACEUTICAL MEETING.

April 16, 1889.

The meeting was called to order and Mr. Alonzo Robbins was elected chairman. The minutes of the last meeting were read and no corrections being called for they were approved.

The registrar exhibited a sample of East Indian Red Bark, sent to the curator of the museum by Messrs. Gilpin Langdon & Co., of Baltimore, and containing 6·22 per cent. total alkaloids, of which 3·8 per cent. is quinine. A manuscript recipe book, commenced by Mr. Robert Shoemaker, about fifty years old, was presented to the library by Messrs. Wiley & Harris.

Mr. England sent samples of sulphonal, phenacetin, tartrate of chinoline, kairine and agaricin.

Professor Remington on behalf of Mr. Charles A. Heinitsh, of Lancaster, presented a wooden mortar which had been used for at least sixty years; to preserve such a mortar, it is necessary to keep it dry. He also presented a stoneware retort which was made in this city about fifty or sixty years ago, by Mr. Abraham Miller who manufactured all kinds of pottery and stoneware. The thanks of the College were voted to the donors.

Dr. Lowe read a paper upon *Commercial Tar*, a subject referred to him at the January meeting; this was accompanied with samples of tar and ointment made both from tar supplied by Mr. Good and some obtained from another source.

Mr. McIntyre also exhibited several samples of tar.

Mr. Procter spoke of the dispensing of tar and said that in his opinion it was best kept for this purpose in a half gallon coffee pot, which had the strainer holes enlarged; then when a quantity was called for place the receptacle upon the scales, balance it and pour in the required quantity. Some thought it might be very conveniently kept in two, four, or eight ounce boxes ready for dispensing, but this was regarded as encouraging grocers and others to deal in it.

Prof. Maisch inquired what kind of tarry products were obtained in the process of making acetic acid by the method used by Dr. Squibb, by subjecting the wood to a definite temperature? Prof. Remington said the temperature was so controlled that no tar was obtained. Prof. Maisch stated that some years ago the "Berichte" published in Berlin contained a paper giving the results of researches made with material furnished by Dr. Squibb, which consisted of empyreumatic products, but differed greatly from ordinary tar. The wood as prepared for the process of acetic acid making was exhibited by Prof. Remington and also the wood after torrefaction, the latter being much changed in color, but still could be used for a variety of purposes in the arts.

In regard to the color of the different samples of tar ointment, Prof. Remington remarked that a small quantity of water in the tar, well incorporated, would cause the color to become much lighter. In connection with this subject, he exhibited samples of *wood creasote* and of *carbolic acid,* which were in the cabinet of Professor Procter some thirty years ago and had been sold in the market as creasote. Attention was called to the fact that at one time the two substances were regarded as being chemically identical, though differing in the degree of purity.

Mr. Mœrk read a paper upon *olive oil,* giving a comparison of American and European made oils. The paper elicited a good deal of discussion. Prof. Sadtler suggested that oils having different saponification numbers might also show different forms of crystallization under the microscope. No such comparison had been made. Referring to a sample of Lucca oil in Florence flasks, which Mr. Mœrk had found to give a brown, but not a red color, with sulphuric acid, Prof. Maisch stated that some years ago he had examined a number of commercial samples in Florence flasks, which were sold as Lucca oil, and found them to give a decidedly red color with the reagent.

Dr. Lowe exhibited three specimens of *dragon's blood* which differed in color, and when treated with alcohol left different amounts of insoluble matter; he thought the drug as found in commerce seemed to contain less resin and more vegetable fragments, than formerly.

Mr. Beringer read a paper on *expressed oil of almonds.* He had observed that the soap of an oil adulterated with peanut oil produced with hydrochloric acid a green color; after considerable experimenting he found this result would only occur when sesame and peanut oil were both present.

Prof. Maisch alluded to the subject of the *cleansing of mortars,* which had been alluded to at the March meeting, and read a paper upon the subject by Mr. H. M. Wilder. The general subject of cleansing different implements led to the remark that scale pans of a fine scale should always be protected by papers, so that they would not be soiled by the material weighed. Mr. Procter spoke of the use of strong sulphuric acid for the cleaning of mortars; after all parts of the mortar had been well covered with the acid, this is poured into another; this is continued till all the mortars had been treated alike; the result would pay for the trouble, the mortars being nice and bright. Mr. Boring found a very efficient cleanser in a mixture of sal soda and caustic lime with sufficient water; after standing some hours the mortars are left bright, both inside and out. The use of bichromate of potassium with sulphuric acid was also mentioned as being useful for the removal from mortars of substances not attacked by sulphuric acid or by alkalies.

Mr. Boring had found starch in the commercial *powdered slippery elm bark;* that it should not be present he satisfied himself by chipping some bark up and testing it with iodine, no starch being indicated. A member stated that *ground* elm bark could be obtained in the market free from starch.

The subject of *saffron* was discussed. An article was supplied as pure, but an examination proved that it was not saffron, though a specimen of the spurious article had not been retained. Attention was directed to new adulterations recently noticed by Mr. Adrian in Paris, and by Mr. Holmes in London, and which consisted in impregnating true saffron with various salts and with coloring matters; fixed salts may be detected by the increased amount of ash left on incineration, which for true saffron should be between 5 and 6 per cent.; but ammonia salts and organic compounds could not thus be detected. The tinctorial power of commercial saffron may afford a convenient way for testing the purity of saffron, if tests for the absence of coal tar and similar colors can be devised, as has been recently shown by Mr. Barnard S. Proctor for Bismarck brown, the yellow solution of which is turned deep brown and turbid by a little tincture of iodine, which has scarcely any effect upon an infusion of saffron.

There being no further business, on motion adjourned.

T. S. WIEGAND,
Registrar.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

Philadelphia College of Pharmacy.—For about two years the Trustees have had under consideration an extension of the courses of instruction, and after considering several plans, it has been finally decided to retain for the present the division into a junior and senior course, and to lengthen the instruction in each from three to four weeks. The new arrangement will go into effect next fall. As heretofore, the lecture course will commence October 1st, and the matriculation list will be closed October 15th, after which time students will be admitted for special branches only. The preliminary junior examinations will be held as heretofore—early in November and December, and the same number of lectures will be delivered each week, namely, six to the junior and six to the senior class. But instead of holding the final junior examinations at the middle and the senior examinations at the end of February, the former will hereafter take place after the close of the first week in March, and the latter at the end of March, whereby the number of lectures will be increased by twenty in the junior course and twenty-four in the senior course. The commencement exercises will necessarily be held one month later than in the past. Various improvements have also been made in the lecture rooms, and others are contemplated both for the lecture rooms and laboratories. Matriculation and examination fees will remain as formerly; the lecture tickets will be $15 for each branch in the two classes. Full third-course students will receive the lecture tickets free of charge, and students selecting the modified examinations will have their first-course lecture tickets made good for the second year.

The following gentlemen have been recently elected *honorary members* of the College: William Saunders, Ottawa, Canada; Dr. Edward R. Squibb, Brooklyn, N. Y.; J. Léon Soubeiran, Montpellier, France; Charles Tanret, Paris, France; Anton Scheurer von Waldheim, Vienna, Austria; Michael

Carteighe, F. C. S., London, England; Dr. Wm. Dymock, Bombay, India; and the following graduates of the College: Frederick Gutekunst, class 1853, Philadelphia, and Dr. Robert Battey, class 1856, Rome, Ga.

The Pharmaceutical Examining Board of Pennsylvania calls attention to the last clause of section seven of the Pharmacy Act, which provides that "All other assistants actually engaged in the business at the passage of this Act shall, upon the completion of a like term of two years' experience, be entitled to registration as qualified assistants without examination." This clause will expire on the 24th day of May, 1889, and all persons entitled to registration thereunder must promptly apply for the same.

At the examination held at Scranton in April, 36 candidates applied for certificates as registered pharmacists, and 16 as qualified assistants. Sixteen of the former and thirteen of the latter were successful.

The Bufialo College of Pharmvcy held its commencement in Music Hall, March 26th, when fourteen young men and two ladies graduated. A prize of $50 for the best thesis upon a subject assigned by the faculty was awarded to F. S. Marsh, of Lander, Pa. The commencement of the Medical College was held at the same time. The valedictory address was delivered by Prof. G. H. Fox.

The Albany College of Pharmacy, at its eighth annual commencement, had 22 graduates. Prizes were awarded to Henry G. Miner, of the graduating class, and to Howard J. Coyne, of the junior class.

The New York College of Pharmacy held its fifty-ninth annual commencement April 16th, at Steinway Hall.

Michigan State Pharmaceutical Association.—Proceedings at the sixth annual meeting held at Detroit, September 4th to 7th, 1888. Ann Arbor. 8vo., pp. 227. A brief account of this meeting will be found on page 588 of our last volume. Next meeting at Detroit, September 10th. Arthur Bassett, Local Secretary.

New Hampshire Pharmaceutical Association.—Proceedings of the fifteenth annual meeting, held at Claremont, September 25th and 26th, 1888. Claremont. 8vo., pp. 30.

President for the current year is G. F. Underhill, Concord; and Secretary, C. B. Spofford, Claremont.

North Carolina Pharmaceutical Association.—Minutes of the ninth annual meeting, held in Goldsboro, August 8th and 9th, 1888. Raleigh. 8vo. pp. 102.

The tenth meeting will be held at Durham during the present month, on the third Tuesday.

EDITORIAL DEPARTMENT.

Convention for the Revision and Publication of the Pharmacopœia of the United States of America.—On another page we publish the official call for a General Convention to assemble in Washington, D. C., at noon of May 7th, 1890, for the purpose of providing for a Revision and Publication of the Pharmacopœia of the United States of America. Every incorporated medical or pharmaceutical college, association or society, desiring to be represented in the Convention, is requested to send its corporate title and a list of its officers and delegates to Dr. Robert Amory, President of the Convention of 1880, care of Dr. Edwin H. Brigham, Assistant Librarian of the Boston Medical Library, 19 Boylston Place, Boston, Mass., in order that a list of the bodies to be represented may be published as directed by the Convention of 1880.

American Pharmaceutical Association.—In the March and April numbers we published a brief account of the traveling arrangements made from St. Louis and from eastern points. We have since learned that the members and their friends may join either party by purchasing from their station round-trip tickets, whichare good for six months with stop-over privilege wherever desired, and with the privilege of returning by any of the transcontinental lines, terminating in San Francisco, without additional charge. Returning by way of Oregon will cost $15 additional for the trip from San Francisco to Portland.

In these respects the two excursions planned are identical in cost. The differences may be summed up as follows:

The route of the western excursion is through Kansas to Denver; thence to Georgetown, etc., return to Denver; thence to Salt Lake City and westward. The eastern excursion will pass through Nebraska to Denver, thence to Manitou, Pueblo, and through the heart of the Rocky Mountains to Salt Lake City, and from there westward.

The western excursion charges in addition to the fare a certain sum which includes sleeping car and hotel accommodations, meals and other necessary expenses on the trip from the Missouri river to San Francisco. The eastern excursion has identical expenses for railroad fare and sleepers, to which must be added cost of meals and hotels *en route*, which may be moderate or extravagant, according to individual taste.

That the northern route will be preferable for the return trip in July, we think, will be readily conceded.

Circulars giving full details may be obtained by addressing Dr. E. Sander, 129 South Eleventh street, St. Louis, Mo., and Prof. Emlen Painter, Broadway and Thirty-fourth street, New York.

The meeting will be held in Odd Fellows Hall, where also a hall has been secured for exhibition purposes. The headquarters will be at the Palace Hotel; the rates are $2.50 for inside rooms with board, and front rooms at a moderate advance. Further particulars will be given in the Secretary's circular.

Eucalyptus Honey.—The Australian *Journal of Pharmacy* for February, 1889, contains the following:

> Eucalyptus Honey.—This is the latest Australian fraud. The preparation is said to be the natural product of the eucalyptus tree as gathered by the wild bees of Australia, and is reputed to be of great medicinal value. We have examined a sample of this mysterious product, and have no hesitation in declaring that it is a mechanical mixture of leaf eucalyptus oil with ordinary honey. * * * It is impossible to say what is the exact nature

of the substance as originally discovered, but from the sample produced in Sydney, and reputed to be the above, there can be no doubt as to its origin and as to the process of its manufacture. We fear the learned doctor (Dr. Thos. Caraman) has been the victim of a practical joke.

Under the title of "Natural Eucalyptated Honey," an account of the pretended discovery of the medicinal virtues of this article was published in this journal, 1887, page 471; it should be corrected in accordance with the above information.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Hand-book of Materia Medica, Pharmacy and Therapeutics.—Compiled for the use of students preparing for examination. By Cuthbert Bowen, M. D., B. A., editor of "Notes on Practice." Philadelphia and London. F. A. Davis, publisher. 1888. 12mo. Pp. 366. Price, $1.40.

This book is intended as an epitome of the branches named in the title suitable for medical students, and lays particular stress upon the physiological action, therapeutical uses and doses of the different drugs, which necessarily are classified from the physician's standpoint according to their medical properties as astringents, tonics, stimulants, etc. In a preliminary chapter on "Method of Study," the author gives some sound advice insisting on practical work by the student himself, with which we fully concur, only wishing that the importance of practical labor on the part of the student had been still more forcibly presented. The accounts of weights and measures, including the metric system of prescription writing, combination of drugs, incompatibilities, etc., though brief, give the salient points in each case.

The remaining portion of the book is in the form of a catechism, which is well adapted for reviewing, and may be very acceptable to students accustomed to memorize, but should not replace more systematic study. As stated before, it is intended for medical students, and young practitioners will doubtless also find it useful inview of the concise manner in which the various statements had necessarily to be made, and on account of the large number of prescriptions introduced into the text. It is not stated why the author did not follow the Pharmacopœia in all cases; for instance, in the origin of acacia (p. 325), calumba (p. 104), elaterin (p. 283), squill (p. 236), etc. Some of the statements are quite vague and, therefore, unsatisfactory; thus, opium is the concrete milk juice, not the dried juice, of the poppy (p. 192); starch can not be said to be an active principle of calcumba (p. 104); the commercial term of liquorice is used for the extract, not for the root (p. 327); phosphate of quinine is not insoluble in water, and acetate of quinine (p. 16) does not form heavy, but on the contrary very light and bulky crystals. If the place of growth is intended for the country in which medicinal plants are indigenous, then the habitat of hyoscyamus (p. 206), cubeb (p. 298) and benzoin (p. 308) is given incorrectly.

The mechanical part of the work—paper, typography and binding—is quite attractive, and but few typographical errors have been observed by us.

Electricity in the diseases of Women, with special reference to the application of strong currents.—By G. Betton Massey, M. D., Physician to the nervous department of Howard Hospital, etc. Philadelphia and London: F. A. Davis, 1889, 12 mo. Pp. 210. Price $1.50.

The aim of the work is expressed by the author in the preface, where he states that "only such conditions receive notice in the treatment of which electricity has recently been urged upon professional favor; and this portion of the work, partakes, therefore, more of the nature of the author's daily work, than of a classical research into the literature of the subject." The experience of others has been utilized as a guide for further investigations, and precautions have been taken to demonstrate the effect of electrical applications, uninfluenced by other remedies. Introductory to the treatment of the various affections, the different kinds of apparatus are described, as well as the qualities and effects of the currents under different conditions, and in an appendix directions are given for making the battery fluid, and for other details in connection with the apparatus used.

The work will doubtless prove of great value to the practitioner interested in the subject, the practical points of which are explained by a number of useful illustrations, in addition to the clear descriptions.

Digest of Criticisms of the United States Pharmacopœia, sixth decennial revision (1880), New York, 1889. 8vo. Pp. 189.

This digest has been prepared by Mr. Hans M. Wilder, and has been published by the Committee of Revision and Publication, of which Dr. Charles Rice is chairman. It is intended as an aid to those bodies which may be engaged in the preliminary revision of the Pharmacopœia for next year's convention. The work is not for sale, but may be obtained from the chairman by those interested in pharmacopœial revision by forwarding the postage, which is 8 cents per copy.

Atti della terza Riunione d' Igienisti Italiani, tenuta nell' Ottobre, 1888, *in Bologna. Milano: Stabilimento Giuseppe Civelli.* 1888; 8vo.; pp. 222.

Proceedings of the third reunion of Italian hygienists.

Transactions of the American Dermatological Association, at its twelfth annual meeting, held in Willard's Hotel, Washington, D. C., September, 1888, in connection with the first meeting of the Congress of American Physicians and Surgeons. Official report by the Secretary, G. H. Tilden, M. D., Boston; 8vo.; pp. 126.

Thirtieth Annual Report of the Inspector of Milk and Vinegar, Boston, from January 1st to December 31st, 1888. 8vo.; pp. 126.

Report on Hydrophobia. By Chas. W. Dulles, M. D., of Philadelphia. Pp. 8.

Reprint from the Transactions of the Medical Society of the State of Pennsylvania.

A Defence of Electrolysis in Urethral Strictures, with Documentary Evidence. By Rob. Newman, M. D., New York, etc.

Reprint from the *Medical Register*, January 5, 1889.

The Debt of Medical and Sanitary Science to Synthetic Chemistry. By Prof. Saml. P. Sadtler, Ph. G.

Reprint from the Journal of the Franklin Institute, March, 1889.

The Psychic Life of Micro-Organisms. A Study in Experimental Psychology. By Alfred Binet. Translated from the French By Thomas McCormack, with a preface by the author written especially for the American edition. Chicago: 1889. The Open Court Publishing Company. Cloth, 75 cents. Paper, 50 cents.

The author is a collaborator of Ribot and Féré, and one of the most eminent representatives of the French school of Psychology. In the above work he presents the most important results of recent investigation into the world of micro-organisms, which branch of comparative psychology is little known, as the data lie scattered for the most part in isolated reports and publications, and no attempt has hitherto been made to collate and present them in a systematized form. The field covered by this book may be seen from the headings of the various chapters, which relate to the motory organs and the organs of sense; to nutrition and the psychology of nutrition; to colonies and psychology of minute organisms; to fecundation in low and higher animals, and in plants, and to the physiological function of the nucleus. Perhaps the most interesting chapters are those on fecundation, which demonstrate spermatozoids to have instincts and vital powers analogous to those found in animals of higher organization. The various subjects are illustrated by eighteen cuts. M. Binet's researches and conclusions show, that psychological phenomena begin among the very lowest classes of beings; they are met with in every form of life from the simplest cell to the most complicated organism, and that there is an aggregate of properties which exclusively pertain to living matter, the existence of which is seen in the lowest forms of life as well as in the highest.

College Botany, including organography, vegetable histology, vegetable physiology and vegetable taxonomy, with a brief account of the succession of plants in geologic time, and a glossary of botanical terms. By Edson S. Bastin, A. M., F. R. M. S., Professor of Botany, Materia Medica and Microscopy in the Chicago College of Pharmacy. Chicago: G. P. Engelhard & Co. 1889. 8vo., Pp. XVI, and 451.

The first edition of this work appeared two years ago under the title of "Elements of Botany," and was welcomed as supplying a long-felt want. The second edition, which is now before us, has been almost entirely rewritten, and is considerably enlarged, the most copious additions being in Part IV., "Vegetable Taxonomy," and in Part. II., "Vegetable Histology." But the parts treating of Organography and Physiology, as well as the Glossary, have also been considerably amended, so that in its present shape the work serves its purpose even better than it formerly did; the more so since the illustrations have been increased in number to nearly six hundred. In other respects, we refer to our favorable notice of the first edition, and heartily recommend the work alike to teachers and student.

Merck's Index of Fine Chemicals and Drugs for the Materia Medica and the Arts. By E. Merck, 1889. 8vo. Pp. 156. Price, $1.

This Index is a complete list of chemicals used at the present time in medicine and the arts, and gives for each the common name and the various scientific synonyms, and in the case of many proximate principles also their origin. We transcribe a few as examples:

Aseptol (ortho-Phenol-sulphonic [ortho-Phenyl-sulphuric, ortho-Sulphophenic, ortho-Sulpho-carbolic] Acid; ortho-Sulpho-phenol [-carbol]—in 33⅓ per cent. solution) [Sozolic Acid].

Manna sugar, Mannit (Mannitol, Mannol; Fraxinin, Granatin; formerly also called Punicin).

Resorcin (Resorcinol; meta-Di-oxy-benzene).

Cedrin from Cedron seed.

Anemonin (Anemone-camphor, Pulsatilla-camphor).

Rotoin from Japanese belladonna.

It will be seen from the foregoing that this Index will be very useful as a kind of dictionary of the nomenclature of chemical substances used at the present time. Certain pharmaceutical preparations are also included. The whole is arranged so as to serve as a price-list, for which purpose several blank columns are found on each page, and the names—common as well as synonyms—are placed in alphabetical order. At the end of the names under each letter sufficient blank space has been left for the addition of newly introduced compounds, so that this Index in its present shape may retain its value for a considerable length of time.

A Laboratory Guide in Chemical Analysis—By David O'Brine, E. M., M. D., D. Sc., etc. Second edition, entirely rewritten and revised. New York: John Wiley & Sons, 1889. 8vo. Pp. 237. Price, $2.

The eight chapters into which the text is divided refer to the reagents, tests in the dry way, tests in the wet way (metals), acids, comparison of bases and acids, water analysis, poisons and general stoichiometry. The material under each head is conveniently arranged for the use of the attentive student, and the instructions given are brief, but clear, and as a rule ample. The tables in chap. V. giving the behavior of the different groups of bases and acids towards the principal reagents, might, perhaps, have been more conveniently assigned to the respective groups of the bases and acids in two preceding chapters. Although the work is evidently intended for students possessing some knowledge of chemistry, it appears to us that the laudable conciseness of the text should not have prevented the stating certain details in some reactions, more particularly of poisons, as for example the behavior of ferric salts towards formates, acetates, sulphocyanates and meconates (pp. 150, 151, 171, 198). The work is thoroughly practical, and shows the author to be a careful observer and teacher in his capacity of professor in the Colorado State Agricultural College and chemist of the Experiment Station. In addition to this the care bestowed upon the proof reading deserves commendable mention; also the general appearance of the book. But we think that the Index might be improved; for in referring to it for information about the forensic recognition of such poisons like arsenic, meconic acid, phosphorus and others, one would scarcely look for them under "alkaloids."

An elementary Textbook of Chemistry. By Wm. G. Mixter, Professor of Chemistry in the Sheffield Scientific School of Yale University, New York: John Wiley & Sons, 1889, 12mo, pp. X and 459. Price $2.50.

This very useful book for students opens with a chapter on chemical physics, which is followed by a general account of elements, atomic weight, symbols and formulas, after which the different elements are considered. With the view of presenting the subject in such a manner that the student may grasp the fundamental principles of the science, and at the same time learn something of the chemistry of common things, the periodic classification has been adopted; acidic and basic groups are treated alternately; experiments to be performed by the students are fully described; graphic, constitutional and empirical formulas are made use of as occasion requires; about 90 well executed woodcuts have been used for illustrating apparatus, crystals, etc.; and by the use of different kinds of type the commoner and rarer substances are distinguished. The work well deserves the attention of teachers of chemistry as a useful textbook for students. The make up of the book is creditable, and proofreading has been very carefully done.

International Pocket Medical Formulary, with an appendix containing posological table; formulæ for inhalations, suppositories, nasal douches, eyewashes and gargles; hypodermic formulæ; use of thermometer in disease; poisons and their antidotes; post-mortem and medico legal examinations; artificial respiration; ligation of arteries; obstetrical table; urinalysis; differential diagnosis of eruptive, typhoid and typhus fevers; tables of pulse temperature, respiration; motorpoints, etc. By C. Sumner Witherstine, M. S., M. D., etc. Philadelphia and London: F. A. Davis, 1888. XIV and 269. Price $2.00.

All but forty pages of the book contain prescriptions, 1658 in number, of prominent physicians of different countries. These formulas are arranged according to the ailments for which the medicines are recommended, and the diseases are enumerated in alphabetical order. The contents of the remaining 40 pages are sufficiently explained in the title. The book is of convenient size to be carried in the pocket, is well bound, and is provided with sufficient blank paper for notes and memoranda.

Warner's Therapeutic and Reference Book. Philadelphia: Wm. R. Warner & Co., 1889. 12 mo., pp. 119. Price $1.00.

Notes on weights and measures, on prescription writing, on incompatibles, on poisons and antidotes; tables of doses, of digestibility of food, of eruptive fevers, etc., occupy about 50 pages of the book, the remainder consisting of a formulary, of which the main portion is arranged alphabetically; the prescriptions are by prominent physicians, mostly American and English practitioners.

American Resorts; with Notes Upon Their Climate.—By Bushrod W. James, A. M., M. D., &c. With a translation from the German by Mr. S. Kauffman of those chapters of "Die Klimate der Erde," written by Dr. A. Woeikoff, of St. Petersburg, Russia, that relate to North and South America and the islands and oceans contiguous thereto. 8vo., pp. 285, cloth. Price, $2.00.

The author states upon the title page that the work is intended for invalids and those who desire to preserve good health in a suitable climate. Having been written for the general public, we do not find in the book learned arguments of the curative effects of certain localities or of mineral springs. The work is descriptive rather than argumentative, and on looking over its pages one is apt to regret that the descriptions are not more lengthy. But these, though brief, are sufficient to convince the reader, if he did not already know it, that—so the author states, "it seems scarcely necessary for Americans to seek relief at the resorts of the humid Riviera, or at the more questionable places of health resorts which afford the excitements and unsanitary accompaniments of city life, when in their own land they may enjoy equally good or even superior climates."

A large map of North America, giving the railroad systems of Canada, the United States and Mexico, is bound with the book, the perusal of which we heartily recommend to those who wish for information about the numerous health resorts of this continent.

Record of Experiments conducted by the Commissioner of Agriculture in the *Manufacture of Sugar from Sorghum* at Rio Grande, N. J.; Kenner, La.; Conway Springs, Douglass and Sterling, Kan., in 1888. 8vo., pp. 162.

A report edited by H. W. Wiley, chemist, and published as Bulletin No. 20 of U. S. Department of Agriculture, Division of Chemistry.

Sixth Annual Report of the Board of Control of the State Agricultural Experiment Station at Amherst, Mass., for 1888. 8vo., pp. 263.

The experiments were carried on under the direction of Prof. C. A. Goessmann.

Report of the Pennsylvania State College for the year 1887. Part II. Agricultural Experiment Station. Pp. 226.

The printing of the report which is dated January 30, 1888, was delayed. The experiments were conducted by Prof. Wm. Frear, and later by Prof. H. P. Armsby.

Second Biennial Report of the California State Board of Forestry for the years 1887–88. 8vo., pp. 182.

A very interesting document, the greater portion of which consists of an account of the pines (Pinus) indigenous to California. Besides a number of county maps showing the extent of forests and kind of timber, the report contains many photographic plates of the different species of Pinus, and of their leaves and cones.

Der Kohlensäure-Gehalt der Luft in Dorpat bestimmt in den Monaten Juni bis September, 1888. Von Jacob Heimann.

The amount of carbonic acid in the atmosphere of Dorpat determined during the months of June to September, 1888.

Studien über dem gerichtlich-chemischen Nachweis von Blut. Von Adolph Klein.

Investigations on the forensic chemical determination of blood.

Untersuchungen über das Verhalten der Fette zu Zuckersolutionen. Von Theo. Pacht.

Researches on the behavior of fats to solutions of sugar.

The above three pamphlets are inaugural essays, and describe experimental investigations carried out in the laboratory of Prof. Dragendorff. Of especial pharmaceutical interest is the last mentioned dissertation on fats and sugars. From observations, Prof. Dragendorff had been led to regard certain sugars as being capable of rendering fats soluble in aqueous liquids. This is corroborated by the experiments of Dr. Pacht, which show that animal oils, as a class, are less soluble than vegetable oils, and among these the drying oils are more soluble. The solution in water is not promoted by sparingly soluble carbohydrates. Of the sugars, those only which emulsionize fats will also render them soluble in water. The saccharoses, more particularly cane sugar and maltose, have a greater solvent power than the glycoses. The solubility of fats varies considerably. Concentrated sugar solution dissolved nearly 2 per cent. of almond oil, but only 0·63 per cent. of olive oil. On adding a little oleic acid to the latter it was more readily emulsionized by the syrup, and probably more of it was dissolved. Linseed oil dissolved to the extent of about 4·5 per cent. Clear solutions in hot syrup usually become turbid on cooling, and on being diluted with water most of the fat is separated.

The History of Education in North Carolina. By Charles Lee Smith, Fellow in History and Politics, Johns Hopkins University. Washington, D. C. 8vo. Pp. 180.

This is one of the contributions to American educational history, which are edited by Herbert B. Davis, and published by the Bureau of Education.

OBITUARY.

Professor Michel Eugène Chevreul died in Paris, April 9th. Born at Angers, August 31, 1786, he studied chemistry under Vauquelin; became preparator of the chemical course in the Museum of Natural History; in 1813 was appointed professor in the lyceum Charlemagne; in 1820 was made examiner in the polytechnic school; in 1824 took charge of the dye works of the manufactory of the Gobelins; in 1826 was elected to the Academy of Sciences, and in 1830 was called to the chair of applied chemistry in the Museum of Natural History as the successor of Vauquelin. Chevreul continued to lecture at the Collège de France until a few years ago, and attended the sessions of the French Academy for over sixty years. He was remarkable for the intellectual vigor which he retained until the time of his death, when he had nearly completed his one hundred and third year. His contributions to science are very numerous, and extend over a period of about sixty years; the most important ones relate to the chemistry of colors and dye-stuffs, and to the composition of fats. The researches on the colors were commenced in 1807, and aside from the essays contributed to various periodicals, resulted in the publication of several special works in 1828, 1839 and 1864. His classical investigations of the composition of vegetable and animal fats, which form the basis of our present knowledge of these products, were commenced in 1811 and continued for a series of years; they led him to point out in 1818 the chemical resemblance of ethal (cetyl hydrate) to alcohol, and in 1823 to regard the constitution of fats as resembling that of the compound ethers.

Samuel W. Gross, M. D., Professor of the Principles of Surgery in the Jefferson Medical College, Philadelphia, died April 16th, in the fifty-third year of his age. He was born in Cincinnati, graduated at the Jefferson College in 1857, and occupied the chair of surgery in the same institution since 1882, when his father, the late Samuel W. Gross, retired, whom the son survived only five years. The deceased had established an excellent reputation as author, teacher and surgeon, and was apparently at the height of his usefulness when an attack of pneumonia terminated his earthly career.

THE AMERICAN

JOURNAL OF PHARMACY.

JUNE, 1889.

OIL OF CAMPHOR.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 52.

By Henry Trimble and Hermann J. M. Schrœter.

Read at the Pharmaceutical Meeting, May 21.

From the literature of camphor oil we find that no two investigators have obtained the same or even similar results. The physical descriptions of the oil are so different as to lead one inevitably to the conclusion that the commercial oil is a variable article. With this idea in mind we collected eight samples from different sources in Philadelphia and New York, and first made a preliminary examination of them with the following results:

No. I. was obtained of Mr. Samuel F. Simes of Philadelphia, who assured us that this sample correctly represented the crude oil from Japan. It had a reddish-brown color, a specific gravity of 0·9632 at 16° C., and a boiling point of 180° C. The odor strongly resembled that of camphor and sassafras.

No. II. from Fritzsche Brothers, New York, was of a darker brown color, much darker than No. I. It had a specific gravity of 0·9819 at 16° C., boiling point of 180° C., and an odor of camphor and sassafras.

No. III. was likewise from Fritzsche Brothers, and was marked "German." It had a sp. gr. of 0·8877 at 16° C., and a boiling point of 170° C. It was colorless, with terebinthinate and mild camphor odor.

No. IV. from a wholesale drug firm of Philadelphia was probably the same as No. III., as its boiling point was the same, its sp. gr. 0·8863 at 16° C., and its other physical properties identical.

No. V. from a dealer in New York was no doubt the same as III. and IV, as it only differed by having the sp. gr. of 0·8803 at 16° C.

No. VI. from a New York importing firm, *marked "rectified,"* had a sp. gr. of 1·006 at 16° C., and boiled at 210° C. Its color was a light yellow, and odor that of sassafras and slightly camphoraceous.

No. VII. from wholesale druggists of Philadelphia was similar to No. VI., with a sp. gr. of 0·9903, boiling point of 206° C., and somewhat darker color.

No. VIII., also from a wholesale drug firm of Philadelphia, was dark reddish brown, with an empyreumatic and camphoraceous odor, a sp. gr. of 0·9546 at 16° C., and a boiling point of 198° C.

They all had an acid reaction; all were miscible in all proportions with 95 per cent. alcohol.

As I. and II. appeared to represent the crude product, they were taken for analysis. No. I. we were able to get in considerable quantity, and in most of the following work it was used.

The remaining samples were submitted to fractional distillation *in vacuo*, and samples III., IV. and V. were found to contain from 1–3 per cent. of camphor in solution in the light fractions of camphor oil. Samples VI. and VII. consisted of the intermediate portions of the commercial oil, the lowest and highest boiling fractions being entirely absent. Sample VIII. contained all the fractions, the lightest in smaller quantity only, but it was quite empyreumatic, and yielded a considerable quantity of a solid residue at 235° C. Each sample was submitted to the action of polarized light, I., II. and VIII. being first decolorized with animal charcoal. The following readings were obtained with the 200 mm. tube in a Wild polaristrobometer:

1.	+ 49°.	5.	+ 62.2°.
2.	+ 32.6°.	6.	+ 28.6°.
3.	+ 61°.	7.	+ 38.2°.
4.	+ 62.2°.	8.	+ 1°.

The following results, it will now be understood, apply to sample No. 1. An alcoholic solution of ferric chloride produced no change when mixed with the oil, and negative results were likewise gotten with saturated solution of sodium bisulphite and with alcoholic ammonium sulphide. Alcohol and fixed oils were found to be absent from the sample.

On agitating the oil with water the latter absorbed the acidity, which was found by appropriate tests to be due to acetic and formic acids. The same portion of oil after agitation with water was boiled for some hours with an aqueous solution of potassium hydrate in a flask attached to an inverted condenser. The resulting potassium compound, decomposed by a mineral acid, separated into two layers. The aqueous layer was distilled, and in the distillate butyric acid was found, besides acetic and formic acids as above.

Three litres of the oil were fractionated *in vacuo* and the distillate collected in four portions as follows:—

1.—20	per cent.	obtained	between	90°–110° C.	*in vacuo*, or	180°–200° C.	ord. pres.
2.—35	"	"	"	110°–120° C.	"	200°–210° C.	"
3.—25	"	"	"	120°–130° C.	"	210°–220° C.	"
4.—20	"	"	"	130°–150° C.	"	220°–240° C.	"

A small amount of resinous residue remained. A quantity of the oil was also distilled at ordinary pressure, but this method resulted in decreasing the amount of the higher boiling fractions and rendering them more empyreumatic. It was found, however, after the original oil was once fractioned, that the lightest portions could with advantage be distilled at the ordinary pressure, but those of higher boiling points decomposed and the use of the vacuum was continued with them through all the rectifications. By redistilling the above four fractions, the lightest ones over sodium, until nearly constant boiling points were obtained, the following fractions resulted:

		Boiling point.
Fraction	A.—145°–155° C.	
"	B.—158°–161° C.	159°
"	C.—161°–167° C.	
"	D.—167°–169° C.	168°
"	E.—170°–171° C.	171°
"	F.—171°–175° C.	
"	G.—175°–177° C.	176°
"	H.—177°–180° C.	
"	J.—180°–182° C.	180°
"	K.—182°–202° C.	
"	L.—202°–206° C.	204°
"	M.—206°–212° C.	
"	N.—212°–214° C.	213°
"	O.—214°–230° C.	
"	P.—230°–235° C.	232°
"	Q.—235°–245° C.	
"	R.—245°–248° C.	247°
"	S.—250°–280° C.	Green oil

It had better be explained that the fractions P, Q, R and S were not the result of fractional distillation alone, but were obtained by treatment to be hereafter explained from fresh portions of the oil. Only those fractions having constant boiling points were examined. All the polariscope readings were made in the 200 mm. tube, confirmed by the use of the 100 mm. tube. The vapor densities were made with the Victor Meyer apparatus. The combustions were carried out in an open tube with cupric oxide and a stream of oxygen. Over ninety combustions were made during the progress of the work which has been carried on uninterruptedly since last December.

Fraction A. 145–155° C.—This fraction was found only in small quantity, having strong terebinthinate odor, of sp. gr. 0·8593 at 16° C., and dextro-rotary = +53°. It was submitted to combustion with following results:

I. 0·100 gm. substance yielded 0·3235 gm. CO_2 and 0·106 gm. H_2O.

II. 0·141 gm. substance yielded 0·453 gm. CO_2 and 0.146 gm. H_2O.

Calculated for $C_{10}H_{16}$.	Found.	
	I.	II.
C—88·23 H—11·77	88·22 11·77	87·62 11·51
100·00	99·99	99·13

Vapor density:

I. 0·1152 gm. subst. vaporized replaced 21 cc. air =4·70.
II. 0·1012 " " " " 18·1cc. " =4·73.
Calculated for $C_{10}H_{16}$.=4·71.

Fraction B. 158–161° C., *b. p.* 159° C.—This fraction of constant boiling point possessed fragrant and terebinthinate odor, of sp. gr. 0·8616 at 16° C., and dextro-rotary=+54°.

Combustions as follows:

I. 0·109 gm. subst. yielded 0·350 gm. CO_2 and 0·114 gm. H_2O.
II. 0·111 " " " 0·358 " CO_2 and 0·1175 " H_2O.

Calculated for $C_{10}H_{16}$.	Found.	
	I.	II.
C—88·23 H—11·77	87·57 11·62	87·96 11·76
100·00	99 19	99·72

Vapor density:

I. 0·1168 gm. subst. replaced 21 cc. air = 4·76.
II. 0·1050 " " " 18·7 cc. air = 4·67.
Calculated for $C_{10}H_{16}$ = 4·71.

Fraction D. 167–169°, *b. p.* 168° *C.*—In somewhat larger quantity than Fraction B, of fragrant odor, colorless, sp. gr. 0·8678 at 16° C., and dextro-rotary=+56·9°.

Combustions as follows gave results for a hydrocarbon:

I. 0·1185 gm. yielded 0·381 gm. CO_2 and 0·124 gm. H_2O.
II. 0·129 gm. " 0·415 gm. CO_2 and 0·1355 gm. H_2O.

Calculated for $C_{10}H_{16}$.	Found.	
	I.	II.
C—88·23 H—11 77	87·68 11·63	87·74 11·67
100.00	99·31	99·41

Vapor density:

I. 0.155 gm. subst. replaced 28 cc. air=4·72.
II. 0·172 gm. " " 31·3 cc. air=4·68.
Calculated for $C_{10}H_{16}$=4·71.

Fraction E. 170–171° C., *b. p.* 171° C.—Of this fraction only a small quantity could be separated, but it consisted of a distinct fraction, with constant boiling point of 171° C. The specific gravity was found to be 0·8737 at 16° C., colorless, fragrant odor and dextro-rotary= +584°.

Combustions gave results as follows:

I. 0·116 gm. subst. yielded 0·3745 gm. CO_2 and 0·1221 gm. H_2O.
II. 0·1341 gm. " " 0·4315 gm. CO_2 and 0·1409 gm. H_2O.

Calculated for $C_{10}H_{16}$.	Found.	
	I.	II.
C.—88·23.	88·05	87 76
H.—11·77.	11.69	11 67
100·00	99·74	99·43

Vapor density:

I. 0·1155 gm. subst. replaced 21 cc. air=4·67.
II. 0.1231 gm. " " 22·5 cc. air=4·65.
Calculated for $C_{10}H_{16}$=4·71.

Fraction G. 175–177° C., *b. p.* 176° C.—This fraction was separated without much difficulty, in large quantity and very constant. It was colorless, strong pleasant odor, resembling cajeput, of sp. gr. 0·8824 at 16° C., and strongly dextro-rotary= +62°.4.

The following combustions and vapor densities give it the formula $C_{10}H_{18}O$:

I. 0·1635 gm. subst. yielded 0·467 gm. CO_2 and 0·168 gm. H_2O.
II. 0·1684 gm. " " 0·4813 gm. CO_2 and 0·1733 gm. H_2O.

Calculated for $C_{10}H_{18}O$.	Found.	
	I.	II.
C—77 92	77·89	77·94
H—11·69	11·42	11 44
O—10·39	10 69	10·62
100·00	100·00	100·00

Vapor Density:

I.—0·164 gm. subst. replaced 26·4 cc. air = 5·28.
II.—0·1724 gm. " " 27·4 cc. air = 5·35.
Calculated $C_{10}H_{18}O$ = 5·33.

Fraction J.—180–182°, *b. p.* 180° C.—Fraction of oil boiling between 185–200° C., on repeated distillation over sodium, gave a small portion of quite constant boiling point, which was with much difficulty obtained quite pure. It a had fragrant odor, was colorless, with sp. gr. 0·8933 at 16° C., and of strong dextro-rotary power = 64·8°.

Combustions gave results as follows:

I. 0·1400 gm. subst. yielded 0·4481 gm. CO_2 and 0.147 gm. H_2O.
II. 0·1475 " " " 0.4740 gm. CO_2 and 0.1540 gm. H_2O.

Calculated for $C_{10}H_{16}$.	Found.	
	I.	II.
C—88·23	87·29	87·64
H—11·77	11·67	11·60
100·00	98·96	99·24

Vapor density:

I. 0·1434 gm. subst. replaced 25·5 cc. air = 4·80.
II. 0·1282 " " " 22·9 cc. air = 4·78.
Calculated for $C_{10}H_{16}$ = 4·71.

Fraction L. 202–206° C., *b. p.* 204° C.—Between 200°–208°C., on repeated distillation, solid camphor separated, which formed in the receiver a semifluid mass. On separating the fluid portion and drying the crystals, they gave on analysis results for camphor. An alcoholic solution was found to possess dextro-rotary power.

Results of combustions:

I. 0·1975 gm. subst. yielded 0·5716 gm. CO_2 and 0·1930 gm. H_2O.
II. 0·205 " " " 0·590 " CO_2 and 0·1940 gm. H_2O.

Calculated for $C_{10}H_{16}O$.	Found.	
	I.	II.
C—78·94	78 93	78·49
H—10·53	10·85	10·51
O—10·53	10·22	11·00
100 00	100·00	100·00

Vapor density:

I. 0·083 gm. subst. replaced 13·5 cc. air = 5·28.
II. 0·115 " " " 18·9 cc. air = 5·23.
Calculated for $C_{10}H_{16}O$ = 5·26.

Fraction N. 212–214° C., *b. p.* 213° C.—The portion boiling at 208–220° C., on rectification, gave a fraction boiling at 212–214° C. Before it was rectified it was placed in a freezing mixture, the separated camphor removed, and on redistilling more camphor separated out in the receiver. This was the case invariably on redistilling the oil after the camphor had been removed. On separating the camphor as near as possible by the use of a freezing mixture, the fraction boiling at 212–214° C. gave the following results, corresponding to the formula $C_{10}H_{18}O_2$.

It was colorless, of mild camphor odor, sp. gr. 0·9802 at 16° C., and dextro-rotary = + 53·4°.

Combustions:

I. 0·1830 gm. subst. gave 0·4750 gm. CO_2 and 0·1717 gm. H_2O.
II. 0·1935 " " " 0·5010 " CO_2 and 0·1840 gm. H_2O.

Calculated for $C_{10}H_{18}O_2$.	Found.	
	I.	II.
C—70 59	70·78	70·61
H—10·59	10·43	10·56
O—18·82	18.79	18·83
100·00	100·00	100·00

Vapor density:

I. 0·1620 gm. subst. replaced 23·5 cc. air = 5·92.
II. 0·1540 " " " 22·5 cc. air = 5·88.
Calculated for $C_{10}H_{18}O_2$ = 5·89.

Fraction P. 230–235° C., *b. p.* 232° C.

It was with great difficulty that a compound with constant boiling point was obtained, and when obtained, it was found still to exert a perceptible action on polarized light. As by simple fractionation the desired result could not be obtained, several litres were treated with an aqueous solution of potassium hydrate, and the light portion distilled off in a vacuum. From that remaining in the still, the aqueous solution of potassium hydrate was separated, and the oil distilled in vacuo. That portion which would have distilled at the ordinary pressure at 230–250° C., was collected, and on repeated rectification, at ordinary pressure, a fraction boiling between 230–235° was obtained. It had the physical and chemical properties of safrol. It was colorless, highly refractive, with the characteristic sassafras odor, of sp. gr. 1·101 at 16° C., and almost inactive on polarized light= + 1·8°.

Results of combustions as follows :

I. 0.1862 gm. subst. yielded 0·507 gm. CO_2 and 0·1050 gm. H_2O.
II. 0 1921 " " " 0·5192 " CO_2 and 0·1130 gm. H_2O.

Calculated for $C_{10}H_{10}O_2$	Found.	
	I.	II.
C—74·07	74·26	73·71
H— 6·17	6.26	6·53
O—19·76	19·48	19·76
100·00	100·00	100·00

Vapor density :

I. 0·1823 gm. subst. replaced 28 cc. air = 5·59.
II. 0·1670 " " " 25·8 cc. " = 5·56.
Calculated for $C_{10}H_{10}O_2$ = 5·61.

Fraction R. 245°–248° C., *b. p.* 247° C.

Three litres of the oil were treated with aqueous solution of moderately strong potassium hydrate, and subjected to distillation in vacuo, until the lighter boiling fractions were removed. The aqueous solution containing the eugenate of potassium was separated and decomposed by a mineral acid. The separated, dark, oily layer collected, dried and rectified in vacuo, gave a product with a boiling point at the ordinary pressure of 247° C. It had a yellowish color, becoming darker on exposure to light, was strongly refractive, with a decided odor of cloves and a sharp burning taste.

It had a specific gravity of 1·057 at 16° C., and was almost inactive on polarized light=+1·4°.

Results of analysis gave the formula $C_{10}H_{12}O_2$.

I. 0·2258 gm. subst. gave 0·607 gm. CO_2 and 0·1475 gm. H_2O.
II. 0·1788 " " " 0·4805 gm. CO_2 and 0·120 gm. H_2O.

Calculated for $C_{10}H_{12}O_2$.	Found.	
	I.	II.
C.—73·17	73·31	73·29
H.— 7·32	7·26	7·45
O.—19 51	19·43	19·26
100·00	100·00	100·00

Vapor density:

I. 0·2135 gm. subst. replaced 32 cc. air=5·74.
II. 0·1820 gm. " " 27·2 cc. air=5·76.
Calculated for $C_{10}H_{12}O_2$=5·68.

Fraction S. 250–280° C.—The treatment of the oil with potassium hydrate gave a larger quantity of this high boiling fraction than the direct distillation of the oil. It had a bluish green color, which with No. I. oil was not permanent, but changed on several days standing to violet, afterwards to pink and then to light-brown. The same fraction from No. II. oil was darker colored and has not faded as yet. A three per cent. solution of the fraction, boiling at 260° to 280° C., in glacial acetic acid, gave a fine violet color on the addition of a few drops of concentrated sulphuric acid. According to Wallach this would indicate a sesquiterpene. The quantity, however, was too small to determine whether it was a definite compound or not.

From the above results we conclude that the following distinct and definite compounds exist in this sample, with a close approximation of the quantity of each:

		Boiling point.	Per cent.	Formula.
(1).	From 145°–155° C.	150°	0·40	$C_{10}H_{16}$
(2).	" 158°–161° C.	159°	12·00	$C_{10}H_{16}$
(3).	" 167°–169° C.	168°	13·00	$C_{10}H_{16}$
(4).	" 170°–171° C.	171°	5·00	$C_{10}H_{16}$
(5).	" 175°–177° C.	176°	15·00	$C_{10}H_{18}O$
(6).	" 180°–182° C.	180°	4·00	$C_{10}H_{16}$
(7).	" 202°–206° C.	204°	10·00	$C_{10}H_{16}O$
(8).	" 212°–214° C.	213°	30·00	$C_{10}H_{18}O_2$
(9).	" 230°–235° C.	232°	7·00	$C_{10}H_{10}O_2$
(10).	" 245°–248° C.	247°	2·00	$C_{10}H_{12}O_2$
(11).	" 250°–280°		1·60	Green oil.

We do not consider that the above lighter fractions have been so satisfactorily identified, as to warrant naming them. The others have already been named by previous investigators, and were fully identified by us. It is possible that (6) consists of dipentene, since Wallach discovered considerable quantities of it in the camphor oil. (5) may be cineol, but we have been unable to get all the reactions necessary for its identification. The odor, however, is characteristic and strongly points to the possibility of cineol being present, but the polarization is decidedly different from that obtained from wormseed oil, which is inactive. Recently there has appeared a statement of the composition of camphor oil by Schimmel & Co.[1]

Our work, however, was nearly completed, as far as now published, when the above pamphlet was issued. The results in part agree, and we can only say that probably they are as similar as might be expected from different investigators on different samples of such a varied substance as this oil appears to be.

Another important paper on the composition of camphor oil was published in 1885, by Yoshida,[2] who found it to consist of terebinthene, citrene, camphor and camphorogenol. Had we used sample of oil No. VI. for the basis of our work the results would probably have approached his. He in turn failed to find in his sample the compound noted by Oishi,[3] who, in addition to camphor, found a hydrocarbon of the composition $C_{12}H_{20}$. We cannot but conclude that these two gentlemen experimented on the true oil, since they carried on their investigations near its source. Since it has become known that the high boiling fractions of the oil are so valuable, it will be safe to conclude that the colorless rectified oils of low specific gravity do not contain all the compounds which naturally belong in this complex substance.

PHILADELPHIA, May 21, 1889.

Colchicine is recommended by Dr. Darier in certain eye affections, and is administered in pill form, each pill containing $\frac{1}{64}$ grain of the drug of which from 1 to 2 or 4, or even 6 pills, can be taken daily. Care must be taken to instruct patients to reduce the dose as soon as intestinal derangements manifest themselves. Some patients have taken as many as 200 pills, without complaining of unfavorable symptoms.—*Med. News*, March 3, 1889.

---

[1] Bericht von Schimmel & Co., Leipzig, April, 1889. See this Journal, page 313.

[2] *Jour. Chem. Soc.*, 47, 779.

[3] *Jour. Soc. Chem. Industry*, 2, 353.

EUONYMUS ATROPURPUREUS.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 53.

By Frank V. Cassaday, Ph.G.

As there has been no complete analysis made of the root bark of Wahoo, the following investigation was undertaken with a view of determining all the important constituents, and adding, at the same time, to what is already known about the active principles.

The analysis of Clothier (Am. Jour. Pharmacy, Nov., 1861), showed the presence of sugar, starch, etc., and, by agitating the tincture with chloroform, "yellow crystals," which were very bitter, soluble in chloroform and boiling alcohol, and of a neutral reaction, were obtained. These results were in part confirmed by Wenzell (Am. Jour. Pharmacy, Sept., 1862), and he added *euonic acid* to the list of constituents, although he did not find the *euonymin* of Clothier to be crystalline. Miller (Am. Jour. Pharmacy, Sept., 1878) added a volatile oil to the list, and with a larger quantity of the euonymin determined it to be uncrystalline.

By my method of procedure the drug was exhausted by cold maceration with petroleum ether, which yielded 0·06 per cent. of volatile oil and 1·24 per cent. of a wax-like body melting at 42° C., sparingly soluble in absolute alcohol, less so in 95 per cent. alcohol, but freely soluble in ether and chloroform.

The drug then yielded to stronger ether a dark-brown substance representing 1·5 per cent. This residue was partly soluble in water, the solution having an acid reaction. This aqueous solution was warmed with barium carbonate until the evolution of CO_2 ceased, filtered and the filtrate slowly evaporated over sulphuric acid, but no crystals formed. On redissolving, treating with dilute sulphuric acid until all the barium precipitated, and agitating with ether, crystals were obtained from the ethereal solution. These crystals were found to be strongly acid with a sour astringent taste. They gave no peculiar reactions with a number of reagents tried, but from their general characters were undoubtedly the euonic acid of Wenzell.

Tests on the ethereal extract for glucosides, alkaloids, gallic and tannic acids gave negative results. The resin, after separation of euonic acid was found to be sparingly soluble in 95 per cent. and absolute alcohol, soluble in aqueous solution of sodium hydrate, from which it was precipitated on the addition of an acid.

Absolute alcohol extracted from the original drug 2·16 per cent., 1·58 per cent. was soluble in water, to which it imparted an acid reaction due to euonic acid. Negative results were gotten for tannic acid, alkaloids and glucosides. Ether was the only one of a number of solvents agitated with the above aqueous solution that extracted anything, and it on evaporation yielded a dark-brown, amorphous mass, having a very bitter and somewhat benumbing taste. This, no doubt, represented the euonymin of previous investigators. The insoluble part of the alcoholic extract consisted of an acid resin apparently identical with that found in the ether extract of the drug.

It will be seen from the results so far that in order to obtain the two active principles of Wahoo, it should first be exhausted with ether to extract euonic acid, and then with alcohol to obtain euonymin. The method used by Carpenter and Wenzell of making a tincture with diluted alcohol and agitating with chloroform was also tried on a much larger quantity of the drug, but in this way mixtures of the two principles were obtained, which would account for Carpenter stating that the active constituent was crystalline with a bitter taste, as he, no doubt, had the crystals of euonic acid mixed with the very bitter euonymin. The remaining results which are much the same as those previously noted by Miller are given in the following summary:

Volatile oil and wax	1·30	per cent.
Euonic acid and resin	1·48	"
Euonymin and resin	2·16	"
Mucilage	1·50	"
Dextrin	5·53	"
Saccharose	1·88	"
Albumenoids and pectin	8·34	"
Calcium oxalate	1·20	"
Coloring, etc., extracted by chlorine water	6·66	"
Ash	11·65	"
Moisture	9·25	"
Cellulose, lignin and loss	49·05	"
Total	100·00	"

Amylene hydrate has been observed by Dr. Jumon (*La France Méd.*) to produce a period of excitement which is quickly followed by sleep. The dose as a hypnotic is three grams. See also AMER. JOUR. PHAR., 1888, p. 584.

SO-CALLED AMBER GUAIAC.

By C. Carroll Meyer, Ph. G.

Read at the Pharmaceutical Meeting, May 21st.

A short time ago I received some guaiac from a prominent wholesale drug house, which was so entirely different in appearance from that usually found in the market (being perfectly clear and free from pieces of wood and bark), I concluded to see if it was pure guaiac. The name given it by the trade is amber guaiac. Its slight resemblance to black pitch (pix nigra), caused me to think pitch was a possible adulterant, also its transparency might be due to resin (Resina, U. S. P.). A given quantity of amber guaiac and black pitch were treated separately in solution of potassa, amber guaiac being completely soluble, black pitch but slightly. Then on burning the two there is an entirely different odor, showing pitch not to be an adulterant. The amber guaiac was treated with hot oil of turpentine, and remained undissolved, showing it was not mixed with resin.

Four fluidounces of tincture were made up with amber guaiac and ordinary guaiac; 275 grains of guaiac of the shops was used to make 4 oz. of tincture (that being about the strength of U. S. P.). It was left standing for over two weeks, being agitated frequently, filtered through tared filter paper, and found to leave 102⅝ grs. undissolved, a little over sixty per cent. of the guaiac used being soluble.

The same quantity of amber guaiac was treated in same manner, and found to be almost completely soluble, leaving about 14 grs. or five per cent. undissolved. Amber guaiac is also completely soluble in aromatic siript of ammonia, and the tincture gives the characteristic blue color with fumes of nitric acid.

The U. S. Dispensatory, page 730 states, amber is said to be an adulteration. Professor Maisch states in his "Materia Medica," that amber is almost insolublein alcohol, and as amber guaiac is almost completely soluble, that proves amber is not an adulterant. Now the point I wish to make is this: If we can get guaiac that is so soluble should we not use less in making the officinal tincture?

Philadelphia 5, 21, 1889.

Toothache drops.—Morphine acetate, ½-1 grain; oil of peppermint, 5 drops; phenol, 20 drops; collodion, 1 drachm. Apply with cotton.—*Jour. de Méd.*

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the American Journal of Pharmacy.

Ointments with Tragacanth.—In preparing ointments composed of vaselin, glycerin, oxide of zinc and gum tragacanth it is indispensable, says M. P. Vigier, to add a small amount of water, but this should be done with certain precautions. He advises that the gum be triturated with the glycerin and a small quantity of water, and the mass thus obtained mixed with the oxide of zinc already made into an ointment.—*Soc. de Phar. de Paris,* April 3.

Mercurial Ointment with Glycerite of Starch.—This mixture, says M. Preud'homme, is not homogeneous as ordinarily prepared, but may be made so by the addition of a small quantity of lanolin.—*Soc. de Phar. de Paris,* April 3.

Action of Glycerin upon Vulcanized Rubber.—M. Morellet states that vulcanized rubber dipped suddenly into boiling glycerin takes the characters of non-vulcanized rubber, *i. e.*, that its parts can readily be joined and that it dissolves in the usual solvents of caoutchouc. The glycerin must be boiling at the time of first contact.—*Soc. de Phar. de Paris,* April 3.

Petroleum Soap.—At the request of Dr. C. Paul, M. Emery has made a petroleum soap suitable for therapeutic uses. The formula is as follows: Petroleum, 50 parts; white beeswax, 40 parts; alcohol of 90 per cent. 50 parts; hard soap (*Savon de Marseille*), 100 parts. The petroleum, wax and alcohol are put together into a matrass and heated in a water-bath until they melt; the soap is then added. When the mixture becomes homogeneous the matrass is removed and agitated until the contents become of a creamy consistence; it is then poured into molds. It is not absolutely necessary to use ethylic alcohol, which serves merely to facilitate the reduction of the wax and the soap. The soap thus obtained contains about one quarter of its weight of petroleum. It is very homogeneous and firm, and emulsifies easily. Parts washed with it do not remain impregnated with petroleum, as is ordinarily the case in preparations of this kind.—*Répert. de phar.,* May 10.

Strophantate of Lime.—The diuretic properties of this preparation have been pointed out by M. Catillon (American Journal of Pharmacy, 1889, p. 137); its characters are described as follows in a report to the *Soc. de Thérap.:* This compound is tasteless, deliquescent and of an alkaline reaction; sulphuric acid gives with it an abundant precipitate of sulphate of lime; carbonic acid does not disturb it; with oxalate of ammonia it gives oxalate of lime; solutions acidulated with hydrochloric acid are precipitated by iodohydrargyrate of potash and phosphomolybdate of soda. "It is this reaction—common to alkaloids—which lead certain authors to believe that strophanthus contained an alkaloid." In treating a concentrated solution of strophantate of lime with sulphuric acid until a cessation of precipitate, filtering, then precipitating with a large excess of alcohol, and in again taking up the precipitate with alcohol of 70 per cent., M. Catillon isolated the azotized substance which was combined with lime.—*Répert. de phar.*, April 10.

PHENATE OF CAFFEINE.—The mixing of equal equivalents of pure phenol and crystallized caffeine gives a true crystalline combination which is very soluble in water. Concentrated solutions of this produce no irritation when applied to mucous membranes. For hypodermic injections a solution of 10 per cent. phenic acid, with q. s. of caffeine may be used.—M. A. Petit; *J. de ph. et de ch.*, April 1.

INCOMPATIBILITY OF ACID FRUIT SYRUPS WITH CAFFEINE AND BENZOATE OF SODA.—M. Raynaud wished to keep a preparation of caffeine and benzoate of soda in gooseberry syrup. The mixture was at first clear; but long, needle crystals were soon deposited upon the sides of the container, and these he found to be of benzoic acid. The remedy consists in adding a small quantity of bicarbonate of soda to solutions of caffeine previously made soluble by the addition of benzoate of soda.—*Bull. de ph. de Lyon; Répert. de Phar.*, April 10.

INCOMPATIBILITY OF DRY ANTIPYRINE AND SALICYLATE OF SODA.—M. P. Vigier finds that if these substances are mixed dry, as for cachets, an oily body forms within a few hours, thus injuring the powder or cachet, and showing in fact an undesirable decomposition. The reaction of the formed substance is alkaline. The reaction of aqueous solutions of these bodies is, when united, slightly acid. Mixed solutions of antipyrine and salicylate of soda remain limpid indefinitely and without apparent change.—*Répert de Phar.*, May 10.

DECOMPOSITION OF IODOFORM SOLUTIONS.—Ethereal solutions of iodoform become very unstable as they approach saturation. In solutions of alcoholized ether, decomposition is retarded, but it occurs—setting free iodine—even when the solution is kept from the action of light. The altered solution may be agitated with a globule of mercury which unites with the free iodine, and the ethereal solution, no longer saturated, becomes more stable. Chloroformic solutions act in the same way.—*Jour. de Méd. de Bordeaux ; Répert. de phar.*, May 10.

Iodoform Poisoning in Children.—Dr. Cazin reports two cases of children who had toxic symptoms after applications of iodoform dressings following surgical operations. In one of them "the symptoms took a comatose and in the other a meningitic form." After a modification of the dressings the symptoms disappeared. Dr. Cazin thinks that iodoform should be used with the greatest caution in dressing open wounds of children.—*Répert. de phar.*, April 10.

Beta Naphthol Dressings.—1. *Weak solution*, for parts in which membranous portions are exposed: Naphthol β, 5 gm.; alcohol at 60°, 1 litre. 2. *Ordinary solution:* Naphthol β, 15 gm.; alcohol at 60°, 1 litre. 3. *Strong solution*, for touching diseased portions of the skin, or septic excoriations; Naphthol β, 15 to 500 gm. per litre. 4. *Solution for interstitial injections, or closed septic cavities:* Naphthol β, 5 gm.; alcohol at 90°, 33 gm.; hot, distilled water, to make 100 ccm.; filter and use warm. A few drops may be injected into indurated glands or abscesses.—*Le Praticien*, April 8.

Beta Naphthol for Internal Use.—The following formula is said to be frequently prescribed by Dr. Dujardin-Beaumetz in cases of dilatation of the stomach, or to combat secondary fermentation in the stomach and intestines: Beta naphthol, salicylate of bismuth and calcined magnesia, āā 10 gm.; divide in 30 cachets; one before each of the two principal meals—*Jour. de Méd.*, April, 1889.

New Reaction of Cupric Salts.—This is based upon the easy transformation of the salts of copper to cupric bromide, under the influence of bromide of potassium, and upon the dehydration, by sulphuric acid, of the salt produced, this being manifested—with bromide of potassium in excess—by a fine coloration of violet red. The reaction is very sensitive, and may also be produced in saline solutions of other metals, such, for instance, as nickel and cobalt. To 2 ccm. of a cold, saturated solution of bromide of potassium, 1 ccm. of concentrated sulphuric acid is added, and the mixture is agitated; the lower portion becomes yellow, but this color disappears on agitation if the bromide be free from bromate. Then, two or three drops of the solution to be tested for copper is added. However small may be the quantity of copper present, a carmine coloration is produced; this brightens with heat, and disappears under the addition of water, which hydrates the cupric bromide. The same action is produced with solid cupric salts. The solution to be tested should first be acidulated with sulphuric acid so as to precipitate the metals, if any, as insoluble sulphates. The reagent may be prepared in advance by adding to a saturated solution of bromide of potassium, half its volume of pure sulphuric acid. This is stirred and filtered through asbestos, so as to separate the sulphate of potash precipitate which forms.—M. Denigès, *Bull. de la Soc. de Phar. de Bordeaux,* March.

BROMIDE OF GOLD IN THERAPEUTICS.—In a memoir lately recompensed by the *Académie de Médecine,* Dr. Goubert describes his successful treatment by this salt of epilepsy and the various forms of migraine. He says that bromide of gold is better tolerated than are the other bromides, though too high doses determine "a not severe cephalalgia without somnolence." The dose for adults is 8 mgm., gradually increased to 12 mgm.; for children, 3 to 6 mgm. The author administered the salt in weak solution. He states that "the action of this medicament is durable, and epileptics who have taken it sometimes remain for several years free from the attacks."—*Répert. de phar.,* April 10.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Mœrk, Ph. G.

Assay of Mercurial Ointment.—1. Weigh 3 gm. of the ointment into a small tared flask, add 50 cc. alcoholic potassium hydrate solution and heat in a water-bath; after a short time the fat is saponified and the solution can be easily poured off from the separated mercury, which is washed a few times with alcohol, finally with ether, and then the flask and contents are dried and weighed.—Kremel, *Pharm. Post,* 1889, 227.

2. To one gram ointment weighed into a small beaker are added 60 gm. ether, 5 gm. alcohol and 6 to 8 drops hydrochloric acid, to facilitate solution of the fat slight heat is applied; the beaker is covered with a watch-crystal and allowed to stand until the liquid becomes clear, when it is carefully decanted from the metallic deposit, the latter washed by decantation with some of the above mixture, finally with ether, dried at 30° to 40° and weighed.—E. Dieterich (*Helf. Ann.*) *Pharm. Centralhalle,* 1889, 267.

Veratrum alkaloids can be estimated by extracting 5 gm. of the root with a mixture of equal volumes of chloroform and absolute alcohol; the solution is agitated several times in a separating funnel with water acidified with hydrochloric acid, the acid solution filtered, rendered alkaline with solution of potassa and shaken in a separating funnel with three successive portions of chloroform; the chloroformic solution is evaporated in a tared beaker, dried at 100° and weighed. From 1·3 to 1·5 per cent. alkaloids are obtained, consisting of jervine and veratroidine; white scales and microscopic prisms make up the crystalline forms.—Kremel, *Pharm. Post*, 1889, 227.

Emulsions.—Hecker recommends the use of mucilage of acacia and powdered sugar in making this class of preparations instead of powdered acacia and water, and states that an emulsion can be made as quickly by this method as an ordinary mixture. It is immaterial in which order the substances are placed in the mortar as by active stirring the familiar "crackling" sound of a perfect emulsion is almost immediately heard; no apprehension need be felt of such an emulsion separating into layers in less than twelve hours. For 10 gm. of the substance to be emulsified are taken: *castor oil,* 10 gm. mucilage and 5 gm. powdered sugar; *almond, poppy, olive* and *cod-liver oils,* 15 gm. mucilage and 5 to 10 gm. powdered sugar; *volatile oils,* 25 gm. mucilage and 10 gm. powdered sugar; copaiba and Peru balsam, 15 gm. mucilage and 5 gm. sugar. For *resins, gum-resins* and *ethereal extracts* an equal weight of mucilage is desirable so as to have a consistent method of preparing emulsions.—*Pharm. Post,* 1889, 229.

An increased solubility of quinine salts in presence of antipyrine was noticed by Triulzi (Boll. Farm.); if 1 gm. hydrochlorate of quinine be heated with 0·4–0·5 gm. antipyrine and 2 gm. water solution takes place at 25–30° C.; with 0·2–0·25 gm. antipyrine at 44–50°; 1 gm. hydrochlorate of quinine with 2 gm. water dissolves at 52 to 56°; on cooling only the last solution deposits the quinine salt. Similar results were obtained with valerianate of quinine. This observation may be of value in preparing neutral quinine solutions for subcutaneous injections.—J. Blabol, *Rdsch.*, 1889, 303.

Oleum Cantharidum.—Heat over a moderate fire 0·3 gm. cantharidin with 20 gm. castor oil and 40 gm. rape oil in a small porcelain dish until solution is effected and then dilute to 200 gm. with rape oil; the addition of the castor oil prevents the separation of the cantharidin.—F. Eger, *Pharm. Ztg.*, 1889, 213.

Methacetin, a new antipyretic, is a lower homologue of phenacetin, having the formula $C_6H_4\left\}\begin{matrix}OCH_3\\NHC_2H_3O,\end{matrix}\right.$ and is prepared in an analogous manner. Para-nitrophenol is first prepared by action of nitric acid upon phenol; the sodium salt reacting with methyl chloride forms sodium chloride and nitranisol; by treatment with nascent hydrogen the nitranisol is reduced to anisidin (para-amidoanisol), which by boiling with glacial acetic acid is converted into *acetyl-anisidin* or methacetin. It forms a faint reddish crystalline powder, is odorless, has a saline bitter taste, is easily soluble in water and alcohol and melts at 127°. Methacetin possesses preservative and antipyretic properties. The dose for children should not exceed 0·3 gm., the smaller dose compared with phenacetin is due to its solubility, and hence easier absorption; after its use the urine gives the para-amidophenol reaction (in HCl solution with calcium hypochlorite a violet color, on agitation changing to green) and has reducing action which is not due to the presence of sugar.—F. Mahnert, *Pharm. Ztg.*, 1889, 228.

Acid nicotine tartrate was used by Dr. H. Dreser for experimental purposes instead of the easily resinifying and decomposing solution of the free alkaloid. It was prepared from the pure alkaloid and a concentrated solution of tartaric acid in alcohol, precipitating the salt completely with ether, dissolving the precipitate in a little boiling alcohol, and allowing the filtrate to cool slowly, by which means the impurities separate out first and are removed; the separation of the alkaloidal salt is made complete by the cautious addition of ether. The salt has the formula $C_{10}H_{14}N_2(C_4H_6O_6)_2 2H_2O$, forms white crystalline needles, easily soluble in water, the solution possessing an acid reaction.—*Arch. der Pharm.*, 1889, 266.

Ferric albuminate with sodium citrate is a scale preparation of iron from which a solution can be made without the use of acids or alkalies. To prepare the salt, 40 liters distilled water are heated to the boiling point and allowed to cool to 50°; to 20 liters are added 1200 gm. solution of oxychloride of iron (dialyzed iron); in the other 20 liters 300 gm. coarsely powdered dried egg albumen are dissolved by stirring, the solution strained and added to the iron solution; 40 gm. solution of soda are diluted with 360 gm. distilled water and with this the above mixture is very carefully neutralized (requires about 300 gm.). The precipitated ferric albuminate is washed by decantation with water which had been heated to 100° and cooled to 50° until the washings are free from chlorine, collected on a wet linen strainer and allowed to drain. 30 gm. citric acid are dissolved in 120 gm. distilled water and neutralized, applying heat, with crystallized sodium carbonate (60–65 gm.); after cooling, this solution is added to the precipitate, which has been removed to a porcelain capsule, and after solution results this is strained and evaporated at a temperature not exceeding 40°, best in a vacuum, to a syrupy consistence, *poured* upon glass plates and, after drying, the scales removed. (If the syrupy liquid be *spread* upon the glass plates, the scales will become opaque, due to small air bubbles which coat the surface and cannot escape.) The scales are lustrous, dark garnet in color, permanent in air; soluble in half their weight of water to form an odorless, neutral solution with a slightly saline and only a faintly ferruginous taste. Contain 15 per cent. iron.

A neutral solution containing 0·42 per cent. iron is made by dissolving 28 gm. of the scales in 770 gm. distilled water, adding 100 gm. alcohol, 100 gm. spirit of cognac, 1·5 gm. each of the tinctures of ginger, galangal and Ceylon cinnamon, filtering after standing for 24 hours, and washing the filter with sufficient water to make the filtrate weigh 1000 gm.

Ferric peptonate with sodium citrate, containing 15 per cent. of iron, is made by dissolving the ferric peptonate prepared according to Am. Jour. Phar.. 1888, 514, in a cold solution made by neutralizing 3·5 gm. citric acid, dissolved in 12 gm. distilled water, with crystallized sodium carbonate (7 to 8 gm.); the solution is evaporated in a steam-bath to a syrupy consistence, and is spread upon glass plates. The scales are of a chocolate brown color, friable, odorless, easily soluble in water, the solution having a mildly saline, slightly ferruginous taste. To make the solution containing 0·42 per cent. iron, 28 gm. of the scales are dissolved by heating with 870 gm. distilled water, 100 spirit of cognac added, the solution filtered, and the filter washed with sufficient water to make the filtrate weigh 1000 gm.

Dialyzed iron with sodium citrate.—30 gm. citric acid are dissolved in 120 gm. distilled water and neutralized, applying heat, with 60-65 gm. crystallized sodium carbonate; to this solution add 1000 gm. solution oxychloride of iron (dialyzed iron), containing 3½ per cent. of iron, evaporate in a steam-bath to a syrupy consistence and spread upon glass plates; after drying at a temperature of 40° the scales are preserved in well-stoppered vessels. The compound contains 31-33 per cent. of iron, and forms dark red-brown hygroscopic scales, easily soluble in water yielding a neutral, mildly saline solution almost free from ferruginous taste.—E. Dieterich, *Pharm. Centralhalle*, 1889, 234.

Assay of coca leaves.—50 grams of the powdered leaves are mixed with water and 20 grams magnesia, dried at 60° and extracted with ether; the solvent is distilled off, the residue is exhausted with 2 per cent. hydrochloric acid (about 30 cc. are needed), the acid solution filtered and agitated with ether until coloring matter is no longer extracted, then rendered alkaline with ammonia and agitated with three successive portions of ether of 25 cc. each; after drying the ether with fused calcium chloride, the ethereal solution is separated, the ether distilled off and the residue weighed, after drying in a dessicator.—Van d. Marck, *Pharm. Ztg.*, 1889, 282.

Narceine.—The melting point is given by various investigators from 92° to 162°. E. Merck, in examining the narceine of commerce, found that all specimens contained acids, most frequently HCl and H_2SO_4, occasionally acetic acid, in addition to other organic impurities; one sample contained as much as 14 per cent. narceine hydrochlorate. In purifying the alkaloid it was found that the last portions of acid were only after great difficulty removed; the best results, although attended with considerable loss, were obtained by precipitating the hydrochlorate with ammonia, the alkaline hydrates or their carbonates. *Pure narceine* melts at 170-171°, beginning to decompose at the same temperature, possesses a faint alkaline reaction and has great affinity for the acids absorbing, when moistened, HCl from the atmosphere. The presence of the hydrochlorate lowers appreciably the melting point; for medicinal use, no preparation, containing meconin, or melting below 165°, should be employed.—*Chemiker Ztg.*, 1889, 525.

Cera amylata, pulverulent wax, is a pill excipient recommended by H. Hager for pills containing volatile or fixed oils, or substances difficultly miscible with water, as extract of male fern, menthol, guaiacol, creasote, etc. It is prepared by cutting with a thin sharp knife fine shavings of pure beeswax, exposing them for some days to the ordinary temperature to remove adhering moisture, weighing and mixing an equal weight of dry rice starch with one-half of the shavings in a porcelain mortar with rough surface; care must be taken that the temperature of the mixing does not exceed 16°C.; after powdering, the remaining half of the shavings are incorporated and trituration continued until a fine powder is obtained, which is at once sifted and placed in tight-fitting containers.—*Pharm. Ztg.*, 1889, 431.

Jeyes' creolin contains, according to a thorough examination by

Otto and Beckurts, hydrocarbons (boiling point, 190–359°), 59·6; phenols (boiling point, 200–310°), 10·4; pyridine bases, 0·8; abietic acid, 23; soda, 2·8; water, 3·4. The miscibility of this creolin with water is due to the presence of the resin soap; that there must be other substances producing the same results is evident from the fact that Artmann's creolin is free from resin or fat soap and still possesses this property.—*Pharm. Centralhalle,* 1889, 227.

INSECT FLOWERS.[1]

By Prof. Jos. Schrenk.

The author has investigated the structural characteristics of the commercial insect flowers, and has pointed out certain differences which may be useful in determining the purity of commercial insect powder, and also its origin. The most important results may be summarized as follows:

The stem of the Dalmatian plant (*Chrysanthemum cinerariæfolium*) consists in the ridges of collenchyma tissue, which is also found in the depressions in the Persian plant (*Chrys. roseum*); but in a good insect powder fragments, composed of collenchyma cells, should be met with only sparingly.

Fragments of the involucral scales, composed of sclerenchyma cells, are much more numerous in the Persian than in the Dalmatian powder.

The outer surface and edges of the scales of the Dalmatian flowers contain numerous hairs consisting of a long cell with attenuated ends placed horizontally upon a one- to three-celled stalk. The Persian flowers are almost entirely glabrous, a white hoariness being found only at and near the base of the scales, and very few hairs near the apex; the hairs are of the same structure as the preceding, only the terminal cell being much longer.

These hairs are entirely absent from the involucre and stem of the so-called Hungarian or Russian daisy; but the scales contain hairs consisting of from four to ten cells and terminating with a much elongated thin-walled, or with an inflated cell. Another form of glandular trichome consists of ten or twelve cells forming a globular head supported on a short stalk.

---

[1] Abstract of a paper published in *American Druggist,* March, 1889.

Besides the usual fluids for clearing up or bleaching the tissues, Schulze's reagent (chloroiodide of zinc) will prove very useful in examining the powder. It will bring out very clearly the hairs and collenchyma cells, which are stained blue, while the sclerenchyma cells and the pollen grains will assume a yellow color. At the same time, of course, starch, a very common adulteration of insect powder, will become plainly distinguishable if present.

The author also directs attention to the presence in the powder of conspicuous fragments consisting of papillæ covering the upper epidermis of the marginal corolla. The petals of other related species are similarly constructed. The pollen grains of the species mentioned are likewise similar in structure. Mœller (*Mikroskopie*, etc., 1886) stated that the petals contain no stomata ; but the author found stomata quite numerous on the marginal corolla of *Chrys. cinerariæfolium*, especially on the lower side.

CHEMISTRY OF THE COCA BASES.[1]

By Dr. O. Hesse.

The somewhat vague discussion that appeared about two years ago in pharmaceutical journals in regard to "amorphous cocaine" induced me to publish my observations on that subject in the *Pharmaceutische Zeitung*[2] while expressly reserving to myself the further investigation of the bases cocamine and hygrine then described very briefly. Liebermann has,[3] however, without waiting for the completion of that inquiry, lately published his investigation of isatropylcocaine, which is for the most part nothing else than the cocamine discovered by me in 1886. Though the investigation of cocamine was at that time all but complete so far as relates to cocamine, I have thought it desirable to continue the inquiry, more especially since the crude bases I operated upon had not been subjected to the action of permanganate, as was the case with the material on which Liebermann operated. However, the subject of my investigation has also been touched by Frankfeld,[4] and therefore in order to avoid further collision it appears desirable to make known at once the results I have arrived at so far.

---

[1] Translated from the *Berichte*, xxii. 665. Reprinted from *Phar. Jour. and Trans.*, April 27, 1889.

[2] *Pharmaceutical Journal*, xviii. 71, 437. *Amer. Jour. Phar.*, 1887, 454; 1888, 47.

[3] See "The Month," in *Phar. Jour.*, Sept. 29, 1888, and Feb. 2, 1889.

[4] *Berichte*, xxii. 133.

In the first place I must mention that two sorts of coca leaves are now met with in commerce. The one sort is derived from *Erythroxylon Coca;* it was formerly investigated by Erdmann and Lossen, and was for some time the only material employed in the preparation of cocaine. Subsequently a second sort came into the market, originating from a variety of *Erythroxylon* growing in Jamaica and St. Lucia, which has been regarded, though perhaps incorrectly, as a variety of the well-known coca plant and termed *Nova-granatense.* It is chiefly this latter kind of coca that has hitherto been used in North Germany for making cocaine.

Cocamine was obtained by me from the last mentioned variety of coca leaves, and from a parcel that contained chiefly that base to the extent of nearly 0·6 per cent. In operating upon the crude base with petroleum spirit some part of the cocamine remained undissolved and by repeatedly dissolving that in dilute acetic acid and precipitating with ammonia the base could soon be rendered sufficiently pure for analysis. In the following statement of the results thus obtained the figures marked A relate to the base precipitated from a dilute solution and perfectly crystalline. Those marked B relate to the hydrochloride dried at the ordinary temperature over sulphuric acid.

	A.		B.
	Dried at the normal temperature.	Dried at 53° C.	
C	67·46	67.43	59·71
H	6·99	7·09	6·81
N	4·33	—	—

These results agree well with the formulæ $C_{17}H_{21}NO_4$ and $C_{17}H_{21}NO_4HCl$, by which I considered the composition of cocamine was represented, especially since platinum determinations gave corresponding results. However, a subsequent determination of chlorine in the hydrochloride gave only 9·11 per cent. This discordant result induced me to examine more closely the products of decomposition, and in that way I ascertained that the true formula of cocamine is $C_{19}H_{23}NO_4$. Hence the substances represented by A and B were really $C_{19}H_{23}NO_4+\frac{1}{2}H_2O$ and $C_{19}H_{23}NO_4HCl+H_2O$.

The attempt to determine the water in the pure base was unsuccessful. When heated to 90°-95° C. it melted, but there was no loss of weight. On heating to 120° C. the loss of weight was very near that corresponding to $\frac{1}{2}H_2O$, but the examination of the residue showed that some methyl alcohol must have been given off as well as water.

By long continued heating at this temperature a point is reached at which the decomposition of the base goes on rapidly and a refreshing odor is given off. This is probably due to the formation of the methyl ester of cocaic acid.

The hydrochloride undergoes decomposition even more readily than the base itself. Even at 100° C. it gives off, together with one molecule of water, a certain amount of methyl chloride; if the salt be heated for some hours to 120° C. the residue contains only traces of chlorine. This decomposition takes place according to the following equation:—

$$C_{19}H_{23}NO_4HCl+H_2O=C_{18}H_{21}NO_4+CH_3Cl+H_2O.$$

The residue thus left is chiefly cocamylecgonine $C_{18}H_{21}NO_4$, but owing to a secondary change it contains some cocaic acid.

A similar decomposition takes place when the water solution of the hydrochloride is boiled for some time, but then the methyl is given off chiefly in the state of methyl alcohol, and on cooling the cocamylecgonine separates as a colorless or yellowish oil. When the solution of the salt is mixed with hydrochloric acid, the decomposition is not only promoted, but the cocamylecgonine produced is also split up into ecgonine and cocaic acid. $C_{18}H_{21}NO_4+H_2O=C_9H_{15}NO_3+C_9H_8O_2$.

I have given the name of cocaic acid to the product thus formed, because it is characteristic of coca. To purify this acid the crude product is boiled with lime and water. From a dilute solution of the lime salt hydrochloric acid precipitates the acid in a crystalline form; by recrystallization from boiling glacial acetic acid it is obtained in the form of small colorless laminæ which melt at 266° C. Cocaic acid is sparingly soluble in ether, but it dissolves more readily in hot alcohol, and on cooling crystallizes out in needles The composition of cocaic acid is represented by the formula $C_9H_8O_2$. The lead salt $(C_9H_8O_2)_2Pb+H_2O$ crystallizes in small needles.

Cocaic acid is in fact nothing else than the substance that has been meanwhile described by Liebermann as γ-isatropic acid, but the melting point assigned to it by that chemist is incorrect and too high.

In the residue left after treating the crude cocaic acid with lime there was a lime salt of another acid that dissolved readily in ether, and crystallized from the ether solution in long flat prisms. The quantity obtained was too small for analysis.

After removing this acid, the hydrochloric solution left on evaporation a residue of ecgonine hydrochloride. It melted at 234°-238° C.

with considerable frothing. Liebermann gives the melting point of ecgonine hydrochloride as 246° C., but the whole of the alkaloid would have been decomposed long before reaching that temperature. This decomposition begins in fact far below 234° C., about 200° C., and its commencement is recognizable by the crackling of the crystals. The platinum salt, which is obtainable in several forms as laminæ, prisms and granular crystals, contained 25·26 per cent. platinum, and the formula $(C_9H_{15}NO_3)_2PtCl_6H_2$ requires 24·93 per cent.

Professor Stockman informs me that the physiological action of cocamine is similar to that of cocaine, but somewhat weaker, so that it must be given in larger doses; its anæsthetic action is especially weak. Experiments that I made upon myself confirm Stockman's observations, and I wish to point out that I was unable to detect any poisonous effect of cocamine. This is the more remarkable, since Lieberman states that the so-called γ-isatropyl-cocaine does not act like cocaine, but as a heart poison. An explanation of this discrepancy will perhaps be found further on.

Attempts were made to obtain cocamine from the crude bases that remained dissolved by petroleum spirit after the cocaine had been separated from that solution, but without success. It was only after the mass dissolved by dilute sulphuric acid had been treated with permanganate until no further reduction took place that a product was obtained by fractional precipitation, which when boiled with dilute hydrochloric acid gave for the most part ecgonine and cocaic acid, together with methyl chloride. At the same time there was obtained a minute quantity of a brownish-yellow oil, which resisted the action of the boiling acid. The same result was obtained in operating upon a specimen of isatropyl-cocaine sent to me by Professor Stockman.

When the crude bases obtained by fractional precipitation were dissolved in ether, and the solution evaporated, there remained a syrupy mass, which when heated for some time to 60° C., no longer dissolved completely in dilute acids. But the portion insoluble in dilute acid was dissolved by ammonia. The solution gave white flocculent precipitates with barium chloride and dilute acids. The substance could be obtained pure by repeated solution in ammonia and fractional precipitation with hydrochloric acid. When dried in the air it could be rubbed to a yellowish-white powder that melted near 120° C., and was readily soluble in ether, ammonia and caustic soda, but not in dilute acids. When heated with concentrated hydrochloric acid this substance did not give off methyl, but when boiled with dilute acid it melted to a yellowish oil, and after some long time was completely decomposed, yielding ecgonine and an acid that was not more closely examined. The composition of this substance is represented by the formula $C_{18}H_{19}NO_4$.

It is probable, therefore, that the acid product contained two atoms less hydrogen than cocaic acid, and that its relation to that acid is the same as that of acrylic acid to propionic acid. For that reason I give the acid the name of cocrylic acid, the substance it is derived from that of cocrylecgonine, and the methylated cocrylecgonine, which would correspond with cocamine, that of cocrylamine. The brownish-yellow oil observed in the decomposition of the so-called isatropylcocaine by hydrochloric acid may be for the most part only cocrylecgonine, and its production may be due to the presence of some cocrylamine in the isatropylcocaine. That moreover is probably the reason that the product obtained by Liebermann from the crude bases possessed poisonous characters.

The liquid from which cocamine had been separated by fractional precipitation by ammonia still contained substances that could be extracted by petroleum spirit and obtained as a tolerably liquid oil that was readily soluble in dilute hydrochloric acid. Platinic chloride added to the solution gave a pale yellow precipitate which contained 19·44 per cent. platinum after drying at 110° C. The last fraction gave only 15·22 per cent. platinum, and therefore the substance was a mixture.

This mixed substance, when boiled with dilute hydrochloric acid, yielded some ecgonine as hydrochloride and an oily non-volatile base, together with some hygrine. The latter was separated by adding baryta and shaking out with ether. There were also obtained cocaic acid, apparently corresponding in quantity to the ecgonine, much cinnamic acid[1] and some benzoic acid. The cinnamic acid was separated in the form of a lime salt, crystallizing in small needles very sparingly soluble in cold water and consisting of $(C_9H_7O_2)_2Ca+3H_2O$.

The melting point of the acid was 131° C., or rather less than that observed by Kraut, Liebermann and Frankfeld. With permanganate it yielded benzoic aldehyd. In regard to the acid said to be benzoic it may be mentioned that its melting point was 121° C., and that it gave the reactions characteristic of benzoic acid.

---

[1] The occurrence of cinnamic acid among the products of decomposition of coca bases was known to me long before the publication of the fact by Frankfeld.

These observations show distinctly that the oil in question did not contain any cinnamylcocaine. It has already been stated that judging from the platinum salt of hygrine its formula is $C_{12}H_{13}N$, and that it may be a trimethylchinoline, corresponding to methylated piperidine; but I shall return to this subject on a future occasion.

From the bases of true coca there was obtained, after separating cocaine, a fraction which had the same percentage composition as cocamine, but differed from that substance by its solubility in petroleum spirit and in other particulars. That substance I termed cocaidine. On decomposing it with dilute hydrochloric acid it was however ascertained that a sensible quantity of cocaic acid was formed, as well as other acids and an oily product that was not readily decomposed by hydrochloric acid. Consequently cocaidine is a mixture, but its further investigation must be deferred for want of material. From the solution out of which that mixture had been precipitated by ammonia oily bases could be obtained as above described, which on boiling with dilute hydrochloric acid behaved in the same manner as those obtained from the other kind of coca, with this difference, however, that the principal part of the acid product in this case was benzoic acid.

From my investigation I consider I am justified in concluding that the "amorphous" bases from true coca consist chiefly of benzoyl compounds of an oily nonvolatile base, together with some cocamine, while on the contrary, those obtained from the other kind of coca—the so-called Truxillo—consist essentially of cocamine and the cinnamyl compounds of that oily base; also that cocamine is in both cases accompanied by another base containing two atoms less hydrogen, which I have named cocrylamine. In both cases the amorphous bases yield some hygrine, but whether it be a product or an educt I have not been able to decide.

THE "IODINE ABSORPTION" EQUIVALENT OF ESSENTIAL OILS.[1]

By R. H. Davies, F. I. C., F. C. S.,

Chemist to the Society of Apothecaries.

Some months ago, when estimating a sample of reduced iron by means of iodine solution, I observed that the indiarubber stopper of the bottle in which the digestion was taking place had apparently become altered; and a further experiment on a weighed portion of pure unvulcanized rubber conclusively showed that under these circumstances the rubber absorbed iodine.

---

[1] Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, April 10. Reprinted from *Phar. Jour. and Trans.*, April 13, p. 821.

About the same time I found that some eucalyptus oil to which aqueous solution of iodine in potassium iodide was added deprived the latter of its iodine, becoming at the same time so much heavier that after repeating the treatment a few times the oil sank to the bottom of the aqueous liquid. These observations induced me to look into such literature as I could find bearing on the subject of iodine absorption by hydrocarbon and essential oils, and this appeared to be somewhat meagre, consisting mainly of the statement that many essential oils reacted violently with solid iodine, and a suggestion in Watt's "Dictionary of Chemistry," vol. iv., p. 190, that since aromatized waters decolorized solution of iodine by virtue of the essential oils dissolved in them, it should be possible to utilize the reaction as a means of estimating the strength of such waters.

No experiments were recorded as to the amount of iodine which given weights of various oils would absorb under these conditions, and up to the present time, so far as I am aware, the necessary data for making this a practical analytical process have not been given.

Having had frequent occasion lately to make use of the process devised by von Hübl for estimating the iodine absorption power of fixed oils, it naturally occurred to me that this useful analytical method would yield results of value when applied to essential oils, and I propose to bring some of the results I obtained before the members of the Society this evening in the hope that they may prove interesting.

Von Hübl's method of working is the following:—25 grams of iodine and 30 grams of mercuric chloride are dissolved in absolute alcohol, and the solution made up to 1 litre. Twenty cc. of this solution are then added to a known weight (0.4 gram) of the oil to be examined, which has been dissolved in 10 cc. of chloroform, and the mixture is allowed to stand some hours, after which it is diluted with 15 cc. of a 10 per cent. solution of potassium iodide, then with 150 cc. of water, and the iodine remaining in the free condition is estimated by titration with standard sodium hyposulphite solution. As the strength of the alcoholic solution varies somewhat with its age it is necessary to perform a blank experiment with each determination of one, or of a series of samples of oil, and from the difference between the amount of hypo solution required for the blank experiment (when no oil is present) and that required for the liquids containing oil, but otherwise exactly similar to the blank experiment, the amount of iodine that has gone from the free to the combined condition through the agency of the oil can easily be calculated.

This amount is usually expressed as proportional to 100 parts by weight of oil, and constitutes the "iodine absorption equivalent" of the oil. It is not to be assumed that the number represents the amount of iodine actually absorbed by the oil, since, without doubt, the process is usually, if not invariably, a substitution process, in which, for each iodine atom entering into the composition of the oil a second combines with the hydrogen thus displaced, and this ultimately forms the familiar mercuric iodide, which can be obtained in crystals upon evaporation of the aqueous liquid.

At the time I commenced this work, and indeed, for some time later, I was not aware that the application of this process to essential oils had been attempted, but Mr. A. H. Allen, F. I. C., whom I consulted on this point, eventually forwarded a reference which, when followed up, showed that in 1886 Mr. C. Barenthin, a pharmacist of Berlin, had applied the process to some eighteen essential oils, and had published his results in the *Archiv der Pharmacie* for October of that year.

Some preliminary experiments showed at once that there was a very great difference in the amount of absorption of iodine by different essential oils.

In order to get some idea as to whether much or little iodine would be taken up, 2 drops of essential oil were dissolved in about 5 cc. chloroform in a small flask, and the "Hübl reagent" added, noting the volume required before the decolorization began to become slow.

This preliminary examination enabled me to divide the oils roughly into four classes, according to their reaction with the Hübl reagent.

In the first class the absorption was very little or none, under 1 cc. of iodine solution being required. This comprised essential oil of almonds, natural and artificial, oils of cassia, chamomile, cinnamon, cummin, cloves, pimento, mustard, American peppermint, Japanese mint, and gaultheria.

In the second class, comprising English dill and caraway oils, the reaction was slow in starting, but afterwards considerable.

In the third class the absorption was to a moderate extent only;

not more than 2 cc. was required, though reaction commenced at the first addition. This class comprised oils of calamus, eucalyptus, fir wool, pennyroyal, sassafras, sandal wood, spearmint.

In the fourth class the decolorization of iodine solution was rapid and abundant, 3 to 6 cc. of reagent being required. This class contained oils of English aniseed, star-anise, bergamot, copaiba, cubeb, fennel, juniper, lavender, English, foreign and "spike," lemon, origanum, rosemary, rue, nutmeg, turpentine and terebene.

The estimation of the amount of "absorption" was then proceeded with, a weighed quantity of the oil being allowed to stand in contact with an excess of the iodine solution during one night. It was soon found that the differences in absorption power were very much greater in the case of essential than in that of fixed oils. In the latter the lowest recorded is about 9 per cent., and the highest about 160 per cent.; but amongst volatile oils, whilst some do not absorb any appreciable amount of iodine, others will remove from solution four times their weight, or 400 per cent.

On this account the uniform quantity of oil, 0·4 gram, always taken when fixed oils are operated upon, is not applicable. A very much smaller quantity must be taken of certain oils, *e. g.*, those of the fourth class above, or a much larger quantity of the reagent than the prescribed 20 cc., which is not so convenient.

The estimations that have so far been made are shown in the table on the opposite page.

In some cases (following Barenthin) I have used a solution of double the strength in iodine and mercuric chloride given above; it is possible by this means to work with a larger quantity of oil; the results do not materially differ. In this case a correspondingly greater quantity of the potassium iodide must be employed in the final operation. The alcohol I have used was the strongest commercial spirit of wine, containing usually 93 per cent. alcohol by weight (*i. e.*, 67 O. P.), having ascertained experimentally that this strength answered as well as absolute alcohol and gave similar results.

It is desirable to make two blank experiments and take the mean, rather than depend upon one, when taking the absorptions of a series of oils.

As an example, the numbers obtained in working one of these will perhaps not be out of place. Taking sample 28 :—

Oil of lavender, French grown.

Amount taken, 0·1277 gram.

Hyposulphite solution required 41·75 cc.

Strength of hyposulphite solution, 100 cc.=1·3034 iodine.

Blank experiment (1), 20 cc. "Hübl" (double strength) required 70·55 cc. hypo.

Blank experiment (2), 20 cc. "Hübl" (double strength) required 70·65 cc. hypo.

Mean of the two blank experiments, 70·6 cc.

70·6—41·75=28·85 cc., the equivalent of "absorbed" iodine;

$$\text{then } \frac{1{\cdot}3034 \times 28{\cdot}85 \times 100}{100 \times {\cdot}1277} = 294{\cdot}46$$

As examples of the agreement between determinations of the same oil I give the amounts of oil used, and the absorption equivalent found, in the individual instances of half a dozen oils for which mean results are given in the table.

Sample.				Absorption. Per cent.	Mean.
3.	Aniseed oil	(*a*)	·0556	188·3	
		(*b*)	·0573	189·2	
		(*c*)	·1536	191·8	189·7
4.	Bergamot	(*a*)	·0475	274·9	
		(*b*)	·0489	277·4	276·1
5.	Chamomile	(*a*)	·1014	68·18	
		(*b*)	·0947	68·04	68·1
6.	"	(*a*)	·0957	71·8	
		(*b*)	·0960	72·4	72·1
7.	"	(*a*)	·216	66·5	
		(*b*)	·1415	64·5	65·5
8.	Caraway	(*a*)	·0443	254·2	
		(*b*)	·0433	255·6	254·9

I venture to direct attention to some points which appear to have interest, and to draw such conclusions as the work so far done seems to me to warrant.

I may say that I feel the utmost confidence in the genuineness of those oils indicated as obtained from the English distiller. In almost all cases the manufacturer has placed these at my disposal specially for purpose of examination, and the agreement between these oils is closer than I should have expected from a consideration of the complex nature of essential oils generally. The samples of oil of chamomile, clove, cubebs, peppermint and sandal-wood well illustrate this agreement.

Oil of cloves (and pimento) I placed in the first class in the preliminary examination as absorbing but little iodine, and was much surprised to find how high the equivalent was.

It appears as if the reaction goes on much more slowly than is usual. In another respect these oils were peculiar. After titrating with the hyposulphite solution the chloroformic solution of oil is usually colorless, and remains so. In the case of these oils, however, it had a deep orange-red color. The cause of this has not yet been ascertained.

Two results of examination of the lavender oil are interesting:—

1. The absorption equivalent of the Mitcham oil from the English variety of *Lavandula vera* is practically identical with that of the oil from the French variety, though the grower informs me that in color and habit the plants differ much from one another.

2. It is noteworthy that the number obtained in a 50 per cent. mixture of French and English lavender oil is very close to the mean of the equivalents of the component oils (actually found 286·2, theory for equal parts 284·7).

The results of the lemon oil examination are suggestive. It is commonly stated that in spite of the assurances of the makers this oil as found in commerce is habitually adulterated with a prepared turpentine.

The absorption equivalent of lemon oil is high, but not so high as that of turpentine; and it is a fact that the lowest equivalent in these seven samples (328·3) is that of an oil that was specially obtained for me three or four years ago by the agent in London of some manufacturers, for purposes of examination. The other samples (which were offered commercially) are all distinctly higher, ranging from 340·3 to 355·1.

The oils of peppermint and of Japan field mint resemble one another somewhat closely in their equivalents, being about 50 per cent. One sample of American peppermint, said to have been prepared from plants procured from Mitcham and cultivated in America, has a much lower iodine absorption equivalent (82) than either of the other three examined, which range from 121·8 to 143·9. Why the American oil equivalent should be more than twice as high as the English I am quite unable to say.

In the preliminary examination of the oils of peppermint I sometimes found that after standing, the chlorofom having in part evaporated, a very permanent green solution was obtained, which had a marked red fluorescence, and also that certain samples of English oil, and all the samples of American oil in my possession, gave a magnifi-

Name of Oil.	Whence Obtained.	Iodine Absorption per cent.	Estimations made.
1. Oil of almonds, essential	English distiller.	No absorp.	Mean of 2 results.
2. “ “ prussic acid removed	“	“	“ 2 “
3. “ aniseed, Russian, 1888	“	189·7	“ 3 “
4. “ bergamot, 1888	Purchased.	276·1	“ 2 “
5. “ chamomile, 1887	English distiller.	68·1	“ 2 “
6. “ “ 1888	“	72·1	“ 2 “
7. “ “ 1886 or earlier	Purchased.	65·5	“ 2 “
8. “ caraway, English	English distiller.	254·9	“ 2 “
9. “ cassia	Purchased.	159·5	“ 2 “
10. “ celery	English distiller.	311·6	“ 3 “
11. “ cinnamon	Purchased.	189·5	“ 2 “
12. “ clove (a) 1887	English distiller.	362·5	“ 2 “
13. “ “ (b) half from clove stems, ’85	“	366·6	One result.
14. “ “ (c), 1885	“	355·1	“
15. “ “ (d), 1889	“	349·5	Mean of 3 results.
16. “ cubebs (a), 1888	“	226·8	One result.
17. “ “ (b), 1885	“	223·1	“
18. “ “ (c), 1889	“	226·0	Mean of 6 results.
19, “ cardamoms	“	139·3	“ 3 “
20. “ cummin, 1877 or earlier	Unknown.	81·6	“ 2 “
21. “ dill, 1888	English distiller.	257·1	“ 5 “
22. “ fennel, 1877 or earlier	Unknown.	158·3	One result.
23. “ juniper, 1889	English distiller.	337 3	Mean of 3 results.
24. “ “ foreign	Purchased.	363·9	“ 2 “
25. “ lavender, English, 1886	Distiller.	265·5	One result.
26. “ “ Mitcham, 1888	“	274·9	“
27. “ “ (Mitcham grown) French variety	“	273·9	“
28. Oil of lavender (French grown)	Purchased.	294·5	“
29. “ “ French (best)	“	262·7	“
30. “ “ mixed equal parts, French and English		286·2	“
31. Oil of lemon, special from agent (a)		328·3	“
32. “ “ (b), 1883	Purchased.	340·3	“
33. “ “ (c), 1888		345·3	“
34. “ “ (d), “	Sample submitted.	348·9	“
35, “ “ (e) “	“	348·0	“
36. “ “ (f), “	“	345·6	“
37. “ “ (g). “	“	355·1	“
38. “ nutmeg, English, 1889	English distiller.	308·3	Mean of 3 results.
39. “ “ foreign, 1888	Purchased.	321·5	“ 2 “
40. “ parsley, English, 1889	Distiller.	255·0	“ 3 “
41. “ peach kernel, English	“	No absorp.	
42. “ pennyroyal, foreign, 1887	Purchased.	188·9	“ 2 “
43. “ peppermint, English (a), 1887	Distiller.	51·2	“ 2 “
44. “ “ “ (b), 1887	“	49 6	“ 2 “
45. “ “ “ (c), 1888	“	57·7	“ 2 “
46. “ “ American (a), 1887	Purchased.	132·2	“ 2 “
47. “ “ “ (b), 1888	Sample from importer.	143·9	“ 2 “
48. “ “ “ (c), 1888	“	121·8	“ 2 “
49. “ “ “ Mitch. (d), 1888	“	81·9	“ 2 “
50. Oil of peppermint, Japanese (a), 1887	Purchased.	48·1	“ 2 “
51. “ “ “ (b) (English grown), 1888.	From distiller.	43·5	One result.
52. Oil of rosemary, foreign, 1887.	Purchased.	325·0	Mean of 2 results.
53. “ sandal wood, English (a), 1888	From distiller.	226·6	“ 2 “
54. “ “ “ “ (b), 1888	“	233·9	“ 3 “
55. “ savin, foreign, 1881	Purchased.	279·5	“ 2 “
56. “ turpentine	“	377·0	“ 12 “
57. “ spearmint, English	“	207·3	“ 2 “
58. “ calamus, 1888	“	181·4	“ 2 “

In addition to these oils, the following solid derivatives of essential oils have been examined:—

59. Anethol from English oil of aniseed, old	Prepared.	177·4	One result.
60. Anethol from English oil of aniseed, new	“	182·9	“
61. Anethol from English star-anise oil	“	177·8	“
62. Camphor	Purchased.	0·46	Mean of 2 results.
63. Menthol	Prepared.	0·12	“ 2 “
64. Thymol	Purchased.	171·5	“ 2 “

cent violet color when the Hübl reagent was carefully added to their chloroformic solution.

This color changes gradually through blue into the green first observed, which it becomes after three or four days. The red fluorescence is well marked. The fact that somewhat similar colors are produced by agency of nitric acid on peppermint oil is, of course, familiar, having been pointed out by Professor Flückiger in 1871 (*Pharm. Journ.*, [3], i., p. 682). From such experiments as I have been able to make, I conclude that the color reactions produced by the iodine solution are very much finer, and are effected much more rapidly than those produced by nitric acid. The Japanese oils do not give any violet or blue. Before leaving these oils, I think it right to give the numbers assigned to such of them as were examined by Mr. Barenthin. Turpentine, 300; clove, 270; caraway, 265; bergamot, 260; juniper, 245; rosemary, 185; anise, 164; lavender, 170; calamus, 155; fennel, 140; cinnamon, 100 (*Archiv der Pharmacie*, Oct., 1886).

The solid substances examined were four. Three samples of anethol, one of camphor, menthol and thymol. In these cases, since the substances were regarded as of known chemical composition, and not mixtures, as the oils very generally are, I thought it probable that if any absorption took place it would be in some proportion bearing a definite relation to the molecular composition. The absorption in the cases of camphor and menthol was so small as to suggest the presence of traces of oil, and that the pure substances would not absorb iodine at all. In the case of thymol, there was decided absorption, amounting to 171·5 per cent. of the thymol taken. Now the formula of thymol being $C_{10}H_{14}O$, if two atoms of iodine entered into reaction with one molecule, the percentage absorption would be 169·3, which is very close to that actually found. One cannot speak with certainty until the product has been isolated and examined, but it is probable that mon-iodo thymol results from this reaction.

The anethol was simply separated by cold and dried between bibulous paper. Doubtless there is some adherent oil, which could be separated by crystallization from alcohol. When recrystallized this will be subjected to a further examination. The only conclusion I can at present draw from the very similar absorption equivalents is that the composition of this substance is the same, whether prepared from star-anise oil or that of the true aniseed.

I have not yet been able to try how far this iodine absorption process would serve as a means of estimating the amount of oil in aromatized waters. It seems feasible to shake up a known amount of the water with a little chloroform, and to digest the chloroformic solution with the Hübl reagent, but at present, so far as I know, it has not been tried for this purpose.

In conclusion, I regret that this account is so much less complete than I had hoped to make it. The facts that the subject is of some interest to members of this Society, and that the present is the last meeting for this session, will, I trust, serve to excuse my presenting it in this incomplete form.

My thanks are due in particular to Messrs. Stafford, Allen & Sons, for the very fine series of oils they have furnished me with; also to Messrs. Geo. Atkinson and Sons. J. and R. V. Matthew, of Croydon, Messrs. Stevenson and Howell, Mr. Samuel Lambert, Mr. J. Moss, Mr. R. Morrison, and to Mr. Thomas Hunter for his able assistance in this investigation.

HUMOUS SUBSTANCES.[1]

By F. Hoppe-Seyler.

On the death of plants or parts of plants, substances of a brown color are formed which are called humous substances. Wood, however, often remains white for years. In dry air, or at a high temperature, plants can be dried without browning. The browning of the surface of a cut apple may be taken as a very rapid example of the process. Bacteria do not seem to be concerned in this change. This brown coloration does not occur to any extent in dead animal tissues. It is not, however, due to the chlorophyll of plants, as it occurs equally quickly in plants which contain no chlorophyll. The almost universal distribution of tannic acid and carbohydrates, and especially of cellulose, suggests that these may be sources of the humous substance, or it may come from the hydrocyanic acid, phenol, and nitrogenous compounds of plant tissues.

Pure cellulose when mixed with mud containing micro-organisms, ferments and yields carbonic anhydride and methane in the absence of oxygen, but no humous substance is formed; in the presence of oxygen, the cellulose (filter-paper) still remains quite white; all sorts of mud being used in the experiments. By heating with water at 188–200°, or with caustic alkalis, humous substances are formed. Water in glass tubes produced a brown residue, and the liquid was found to contain formic acid, catechol, and protocatechuic acid; when platinum tubes were employed, there was a brown residue, but the other products obtained in glass tubes were absent, as they are due to the decomposition of the humous substance produced by a small quantity of alkali, dissolved out from the glass at the high temperature to which the tubes were subjected. Other experiments were performed with strong alkalis, and the resulting gases, as well as the residue, were analyzed.

---

[1] *Zeit. physiol. Chem.*, xiii., 66—121; reprinted from *Jour. Chem. Soc.*, 1889, p. 285.

The fermentation of wood-gum was found to be similar to that of cellulose; and it is supposed that the lignic acid may be instrumental in the formation of humous substances in turf, peat, etc.

Tannin red, obtained from certain plants by extracting with water, and the phlobaphen of Stähelin and Hofstetter, an amorphous brown substance, are apparently derivatives of tannic acid, and may be included under humous substances. The preparation and properties of a large number of these substances are described. They are formed by the action of alkalis on various carbohydrates (dextrose, lactose, cane-sugar, glycuronic acid, etc.); from various aromatic substances; and those obtained from various vegetable sources are also described. They are amorphous, differing in percentage composition, mostly containing nothing but carbon, hydrogen, and oxygen. A few contain nitrogen, like those described by Udánszky (1887) in urine. A derivative of humous substances called humic acid is described, and various names are given to various other members of the group.

The original paper must be consulted for details concerning their preparation and analysis; the following summary will, however, indicate the methods adopted in their separation:

Humous substances fall into three groups: the first includes those which are soluble neither in caustic alkalis nor in alcohol, but unite with alkalis, forming a slimy mass. This group includes the *humin* and *ulmin* of Mulder. The second group consists of those which are completely soluble in alkalis, and precipitable from such solutions by acids; the precipitate formed is voluminous and jelly-like, and is insoluble in alcohol. A part of the *tannin reds*, and of *humic* and *ulmic* acids, belong to this group. The substances in the third group resemble those in the second with regard to their solubility in alkalis;

but the precipitate produced by acid is easily soluble in alcohol. *Phlobaphen,* a part of *humic* and *ulmic acids,* and the brown acids included under the name *hymatomelanic acids* (which are formed from the members of the first two groups by heating with caustic alkalis) belong to the third group.

NOTES ON ESSENTIAL OILS FROM MESSRS. SCHIMMEL AND CO.'S REPORT.[1]

Angelica Oil.—The results obtained from the parcel of angelica root imported from Japan, to which reference was made in the previous report (see before, p. 326), differ essentially from those experienced with the German drug. The Japanese roots have the same tufted form as the German, but are lighter and nearly white and are provided with stronger rootlets. They are referred to one of two species, *Angelica refracta,* Fr. Schmidt (Jap. "*Senkiyu*"), or *A. anomala,* Lall. (Jap. "*Biyakushi*"), both of which, according to Rein, are cultivated in the open fields of Japan. This Japan angelica root proved to be comparatively very poor in essential oil, the yield being only one-tenth per cent., the oil also being essentially different from commercial angelica oil. Whilst the German distillate has a specific gravity of 0.853 at 20° C., that of the Japanese is 0.912 at the same temperature. At 10° it gives a separation of crystals, and at 0° it solidifies to a paste. The crystalline mass obtained by cooling and draining had the properties of a fatty acid melting at 62°–63° C. The oil boils between 170° and 310° C., the last portion that passes over having a beautiful blue-green color. The residue solidifies upon cooling and consists principally of the non-volatile fatty acid. The odor of the oil is unusually intense and persistent, more acrid than that of the German angelica oil, but possessing the characteristic suggestion of musk. The cost of this oil deprives it of any industrial importance.

Anise Oil.—The statement made on "high authority" in the paper read at a recent evening meeting of the Pharmaceutical Society by Mr. J. C. Umney, to the effect that for every pound of aniseed oil from *Pimpinella Anisum* a thousand pounds of star-anise oil are met with, and the subsequent statement of Mr. John Moss that he would put the proportion as one to ten thousand, are sharply criticized as underestimating the importance of the aniseed oil industry. Messrs. Schimmel say that in their factory alone under ordinary circumstances 7000 kilos of aniseed are worked up daily, yielding 200 kilos of aniseed oil. They place the annual production of oil from seeds of *Pimpinella Anisum* at 42,000 kilos, or equal to about 1400 canisters of star-anise oil, and they raise the question whether the annual production of star-anise oil amounts to 1400 canisters, to say nothing of one thousand or ten thousand times that quantity. Messrs. Schimmel make this correction in the hope that in future such questions may be discussed "with more care and upon a better basis, bearing in mind that the centre of gravity of the manufacture of essential oils lies in Germany, and not in England."

---

[1] From the April *Bericht* of Messrs. Schimmel and Co. of Leipzig; reprinted from *Phar. Jour. and Trans.*, April 6 and 20.

Bay Oil (*Myrcia acris*).—Under this heading the following two recipes for the preparation of "bay rum" are given:

I.

Bay Oil	2 drachms.
Pimento Oil	1 drachm.
Cloves Oil	10 drops.
Alcohol (95 per cent.)	½ gallon.
Water	½ gallon.

Mix and allow to stand for several days, then filter.

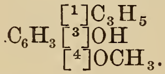
II.

Bay Oil	1 ounce.
Alcohol (95 per cent.)	½ gallon.

Mix and allow to stand for a fortnight. Then add one gallon of good Jamaica rum. The bay rum made according to this recipe is said to correspond with the imported article.

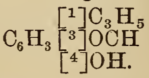
Betel Oil.—A statement made in a previous report to the effect that the essential oil of betel leaves contained eugenol was considered to be opposed to a report by Professor Eykman upon the composition of a sample of betel oil examined by him; a fresh investigation has therefore been made with the following result. The sample of betel oil examined was a slightly brown colored liquid, sp. gr. 1·024 at 15° C. It consisted up to about two-thirds or three-fourths of a phenol, the boiling-point of which in partial vacuum, under a pressure of 12 mm., lay at 131-132° C.; under ordinary atmospheric pressure it underwent decomposition on boiling. The specific gravity of the phenol was 1·067 at 15° C. Examination of the oxidation products, acetyl compound and methyl ether showed that this compound was not eugenol, but an isomer, the composition of the new compound and of eugenol being represented as follows:

New Compound.



$$C_6H_3\begin{matrix}[^1]C_3H_5\\ [^3]OH\\ [^4]OCH_3.\end{matrix}$$

Eugenol.



$$C_6H_3\begin{matrix}[^1]C_3H_5\\ [^3]OCH\\ [^4]OH.\end{matrix}$$

The second constituent of betel oil boiled practically between 250° and 275° C., had a very agreeable tea-like odor, and consisted for the greater part of a sesquiterpene ($C_{15}H_{24}$), cubebene, which is characterized by its dihydrochlorate melting at 117–118° C. This composition differs considerably from that given by Professor Eykman, but how far the difference may depend upon the oil examined by Professor Eykman having been distilled from fresh leaves, whilst that examined by Messrs. Schimmel was distilled from dried leaves has not been determined.

Bergamot Oil.—Some question having been raised recently as to the natural color of bergamot oil, Messrs. Schimmel publish some information on the subject obtained from two of the largest producers in Reggio. One of them says: "This essence occurs for the most part of a brown-yellow color. A certain quantity approximates more to green, but this is an essence prepared only from unripe fruit. In commerce it seldom occurs pure, since it is ordinarily mixed with the essence prepared later from ripe fruit. Carefully examined in a glass tube it cannot properly be called 'green,' but there is always a yellow color perceptible. The emerald green essences which have been exported from Messina are such as have been allowed to stand for a long time in badly tinned vessels, and the color is due to oxide of copper." The second correspondent says: "After the working of the bergamot fruit the essence obtained is honey colored, and it is usually put forward and sought for of this color. The green color is acquired when the oil is allowed to stand a certain time—about seven or eight months—in the vessels; it attacks the tinning and becomes green through contact with the copper. This is the correct explanation of the two colors; any other is false."

Cajeput Oil.—Referring to a large consignment from Macassar, Messrs. Schimmel state that according to their experience cajeput oil directly imported is always genuine and trustworthy, but that in intervening commerce, and, as they hear, especially in America, it gets adulterated with camphor oil. On practical grounds an adulteration with eucalyptus oil is not to be feared, as that oil is more costly.

Calamus Oil.—Reporting on the Japanese calamus root referred to in the previous *Bericht* (see before, p. 326) it is stated that these roots do not differ externally from European calamus roots, and are no doubt derived from the same species. They contain 5 per cent. of a highly aromatic essential oil, which is considerably heavier than the German calamus oil, having a specific gravity of 0·991 at 16° C. It boils between 210° and 290° C.; if the distillate be collected in two fractions, the lower portion has the characteristic calamus odor, while the higher boiling portion gives off the peculiar sesquiterpene odor. Japanese calamus oil also differs from the European in solubility, 1 part dissolving in 500 parts of 50 per cent. spirit, the German oil requiring 1000 parts of spirit.

Camphor Oil.—Under this name the light-boiling portion of the crude camphor oil appears to find enormously increasing industrial application as a substitute for turpentine oil. More detailed information is now given concerning its characters and composition. It is stated that after the preliminary runnings, smelling disagreeably of aldehydes and acids, the oil begins to boil at about 158° C. The first fraction, boiling between 158° and 162° C., consists of right-handed pinene, identified by the formation of the hydrochlorate, $C_{10}H_{16}HCl$, as well as of nitrosoterpene, melting at 130°, obtained by treatment of pinene nitrosochloride with alcoholic potash. In the portion boiling between 169° and 171° phellandrene was detected, but in very small quantity; it was identified by its nitrite, melting at 102°. Dipentene was found in camphor oil by Wallach, and the tetrabromide and nitrosylchloride compound may be easily obtained from the fraction boiling at 180°. The occurrence of terpineol in camphor oil has not been determined with certainty. Whilst the formation of a compound having the composition $C_{10}H_{16}2HI$, as well as of terpin hydrate, dipentene and terpinene, rendered its presence highly probable, it was, on the other hand, rendered doubtful by repeated failures to obtain the dipentene dihydrochlorate and tetrabromide. There is also in camphor oil a considerable quantity of a hydrocarbon, boiling about 260° to 270°, from which was obtained the hydrochloric acid compound, melting at 117°, characteristic of the sesquiterpene cubebene. In the highest boiling fractions of camphor oil occurs an intensely blue colored oil, which is probably identical with the constituent, boiling at about the same temperature, occurring in chamomile, millefolium, wormwood and other oils. The constituents of camphor oil found up to the present are—

Boiling point.	Constituent.	Formula.
158°–162°	Pinene	$C_{10}H_{16}$.
170°	Phellandrene	$C_{10}H_{16}$.
176°	Cineol	$C_{10}H_{18}O$.
180°	Dipentene	$C_{10}H_{16}$.
204°	Camphor	$C_{10}H_{16}O$.
215°–218°	Terpineol	$C_{10}H_{17}OH$.
232°	Safrol	$C_{10}H_{10}O_2$.
248°	Eugenol	$C_{10}H_{12}O_2$.
274°	Sesquiterpene	$C_{15}H_{24}$.

Cananga Oil.—The opinion is expressed that the finer sorts of Java cananga oil can be used for all purposes for which the ordinary qualities of ylang-ylang oil suffice, since both oils are derived from the same plant and the extraordinary differences in quality are due to the more or less perfect methods of preparation.

Chamomile Oil.--In order to prevent as much as possible the original blue color of this oil from changing to green it is recommended that it should be protected carefully from the influence of light and heat.

VARIETIES.

Antipyrin is stated by Dr. Herbert Snow (*Brit. Med. Jour.*) to relieve the pain of incurable cancer, and to act best when given with morphine, the analgesic effect of which it greatly enhances.

Lactic Acid in Tuberculous Diarrhœa.—Ségary and Aune recommend lactic acid, 2, 6, or 8 grams in twenty-four hours, in the treatment of diarrhœa of phthisis. They report 9 successful cases.—*Jour. Amer. Med. Assoc.*, March 2, 1889.

Creasote in Phthisis.—In the clinik of Dr. Verstracten (*Rev. gén. Clin. et Théra.*), creasote has been found of service in phthisis. It may be given in the following ways:—

(1). One part may be mixed with 20 of cod liver oil. Of this mixture 3 to 6 teaspoonfuls must be administered daily.

(2). It may be combined with an equal part of almond oil, and five to ten drops of the compound given three times daily in two tablespoonfuls of warm milk or broth.

(3). Six parts of creasote may be added to eight of tincture of nux vomica. Of this, eight to ten drops may be given three times daily in two teaspoonfuls of sweetened water, before meals.

It is stated that creasote increases appetite, relieves the breathing and decreases the expectoration and cough.—*Med. Chronicle*, Feb., 1889.

Dr. Robinson (*Am. Jour. Med. Sci.*, Jan. 1889) regards beechwood creasote as a remedy of great value in the treatment of pulmonary phthisis, particularly during the first stage. Not only does it lessen or cure cough, diminish, favorably change, and occasionally stop sputa, relieve dyspnœa in very many instances; it also often increases appetite, promotes nutrition, and arrests night-sweats. It does *not* occasion hæmoptysis, and rarely causes disturbance of the stomach or bowels, except in cases in which it is given in *too large* doses.

MINUTES OF THE PHARMACEUTICAL MEETING.

May 31st, 1889.

The meeting was called to order and Mr. Wm. B. Webb was asked to preside. The minutes of the last meeting were read, and no objections being made, they were approved.

Mr. Meyer showed a bottle containing about a pint of water, which was about half of what was poured off from the tar contained in a gallon can which was purchased for a gallon of tar. After discussion it was thought that the subject was of sufficient interest to be referred to the meeting to be held next fall.

A paper upon *Oil of Camphor*, by Professor Trimble and Mr. H. J. M. Schroeter was read and illustrated with a great variety of specimens, exhibiting the commercial oils and the fractions obtained during the investigation. The interesting paper called forth a great deal of discussion in reference to the marked difference in appearance and odor of the fractions, and to the variation of the commercial oil, more particularly as compared with the oil of camphor as it had been in commerce forty or fifty years ago. Professor Maisch showed a sample of the oil which had been in his possession nearly thirty years. Originally it was liquid during the summer, and deposited some camphor only in winter, while now much camphor remains crystallized even in summer.

Dr. Lowe exhibited a specimen of *asafetida* which contained but about 20 per cent. of matter soluble in alcohol. Professor Maisch stated that according to Dymock the purest asafetida which occurs in distinct tears, was consumed in the East, while the article seen in our commerce consisted of white opaque tears free from mineral additions, but imbedded in a yellowish mass, mixed with earthy matters, principally calcium sulphate. On removing the tears a mass would be left agreeing in appearance and other characters with the specimen shown by Dr. Lowe. The kind called *hingra* in India is ordinarily found in commerce. The Persian asafetida and probably the greater part of that coming from Afghanistan is the product of Ferula Scorodosma; while Ferula Narthex is indigenous to Thibet. The fetid translucent variety called *hing* in India is derived, according to Mr. Dymock, from Ferula alliacea.

Mr. Wallace Procter said that in 1867 his father brought from England some asafetida in distinct opaque tears. Asafetida is also seen in our commerce consisting of tears, to which usually a small quantity of the yellowish mass with earthy matter is adhering; occasionally a softer kind, containing little of the adulterated mass is met with. The Actuary stated that about 1867 a lot of asafetida was put upon the market which consisted of 7 or 8 per cent. of soluble matter, the remainder being nearly altogether sulphate of calcium. It agreed with Pereira's stony asafetida.

Mr. C. Carroll Meyer exhibited a specimen of *amber resin of guaiacum* and read some notes referring to the testing, which showed the article to be pure (see page 286). By distilling the alcohol from a quantity of tincture of guaiacum for which there was no further use, Prof. Maisch said he had obtained pure guaiac resin, which strongly resembled the sample submitted by Mr. Meyer.

Dr. Lowe exhibited a *graduated measure* which, after being broken in the foot, had been fastened in a tin box-lid with plaster of Paris. Several members stated they had done this for years and found such measures more durable than glass-footed ones.

Mr. Beringer exhibited a sample of *glycolin*, a petroleum product made in this city. It is one of the lower paraffins, is possessed of peculiar solvent powers, and on account of its non-irritating qualities and freedom from odor is recommended as a substitute for glycerin in the treatment of wounds, affections of the skin and scalp, and for the treatment of inflamed mucous surfaces. The sample submitted was colorless and had a specific gravity of 0·8662; it is readily miscible with fixed and volatile oils with the exception of castor oil. Chloroform and ether mix with it in all proportions; alcohol and glycerin are insoluble in it, and carbolic acid in liquid state is immiscible; but the crystallized acid forms an opalescent white solution; creasote, however, readily dissolves into a clear solution. It is also a solvent for iodine, bromine, sulphur and beta-naphthol, naphthalin, menthol, thymol, camphor and iodoform. Some of the alkaloids are likewise soluble in it, veratrine yielding a two per cent. solution, cocaine a six per cent. solution. On treating with about two per cent. of quinine on cooling a gelatinous mass is formed. It is also a good diluent for oleic acid and oleates.

Mr. McIntyre alluded to the expunging of *compound resin cerate* from the pharmacopœia, and expressed his opinion that it should be restored.

Mr. Mœrk read some extracts from a paper by Dr. Bernardy that Mr. England had sent to him for that purpose detailing the superiority of *mercuric iodide* over the bichloride of mercury as an antiseptic showing that solutions of one part in four thousand of the solvent were fully equal to one part of the mercuric chloride in two thousand of solvent, and at the same time less toxic and less irritant; the solution of the mercuric iodide is always made by means of potassium iodide.

Professor Maisch exhibited a log of *Pinus palustris*, which had been sent to Mr. Bullock for the college from North Carolina. It illustrates the method of obtaining *turpentine;* a box as it is technically termed is cut into the trunk of the tree, the bark above this box is cut away, and the sapwood is hacked so that the oleoresin runs down into the box, and when a sufficiency has collected it is drawn off. In answer to an inquiry it was explained that as the bark was removed only on one side the tree still lived and would furnish turpentine for a number of years.

There being no further business the meeting adjourned until the third Tuesday in October.

THOS. S. WIEGAND,
Registrar.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

New York College of Pharmacy.—The chair of botany and materia medica having become vacant by the resignation of Prof. W. De F. Day, the vacancy has been filled by the election of Dr. Henry H. Rusby, whose name has become well known for his botanical researches and his explorations in Arizona and in South America. Prof. Arthur H. Elliott, Ph. D., who has had charge of the chemical laboratory since 1888, and lectured on physics since 1886, will hereafter lecture also on inorganic chemistry.

The Massachusetts College of Pharmacy held its twenty-first annual commencement March 15th, the number of graduates being thirty. The degree was conferred by President Canning and the valedictory was delivered by Prof. G. F. H. Markoe.

The National College of Pharmacy at Washington, D. C., had its commencement May 16, with a graduating class of thirteen.

St. Louis College of Pharmacy.—Prof C. O. Curtman has tendered his resignation, and at a meeting of the Board held May 2, the following resolution was unanimously adopted :

Resolved, that the executive board of the St. Louis College of Pharmacy accept with regrets the resignation of Professor C. O. Curtman, who has been connected with this college for the last eleven years as professor of chemistry and has largely contributed to the success of building up said college.

A committee has been entrusted with the preliminary steps for filling the vacancy.

The Florida Pharmaceutical Association held its third annual meeting at Ocala, April 16. Routine business was transacted and a committee was appointed for the purpose of securing a less defective pharmacy law than the present one. The present officers are H. C. Cushman, Pensacola, President; William Anderson, S. B. Leonardi and J. S. Frazer, Vice-Presidents; S. P. Watson, Jacksonville, Secretary, and E. Delouest, Ocala, Treasurer.

The Louisiana Pharmaceutical Association met at its seventh annual meeting in New Orleans April 10, president C. L. Keppler in the chair. The different officers and committees presented their reports, and the President delivered the annual address. A committee appointed for the purpose called upon the Louisiana Medical Society then in session in New Orleans, and the latter resolved that the "National Formulary" be regarded as the standard for the unofficinal preparations contained therein. The Association voted to contribute annually $250 towards the salary of the instructor in pharmacy in the Tulane University. The salary of the Secretary was fixed at $100. There are 473 registered pharmacists and 80 qualified assistants in the State. Dr. Fred. Hoffmann, New York, and Professor C. L. Diehl, Louisville, were elected honorary members. The officers for the ensuing year are: F. M. Brooks, Baton Rouge, President; J. B. Lavigne and F. C. Godbold, Vice-Presidents; L. F. Chalin, Secretary; Mrs. E. Rudolph, Corresponding Secretary, and E. Brand, Treasurer. The next meeting will be held in New Orleans, on the first Wednesday in April, 1890.

The New Jersey Pharmaceutical Association assembled in Bridgeton at its nineteenth annual meeting May 22 and 23, President G. H. White in the chair. Mayor DuBois tendered the hospitality and freedom of the city, to which the President replied. Among the reports of officers was the final one of the first treasurer, the venerable William Rust of New Brunswick, who during the nineteen years had received $5,478.72, and paid out $5,322.76, leaving a cash balance of $155.96. Mr. Rust declined a re-election.

Greetings were exchanged by telegraph with the Nebraska Association, then in session in Lincoln.

A Committee appointed to report on the sale of liquors by pharmacists had secured the opinion of Hon. Cortlandt Parker, according to which pharmacists may sell intoxicants as a medicine, but not as a beverage; the object of the State laws was stated to be to advance morals, and not to retard human progress, and the honest and prudent pharmacist would have no trouble in obeying those laws.

The Board of Pharmacy reported for the past year to have registered 55 pharmacists on diplomas, and to have examined 90 candidates of whom 39 passed; the total number of registered pharmacists in the State is 1600.

Among the subjects presented under the head of "trade interests" was a modification of what is known as the rebate plan, intended to prevent the underselling of proprietary articles; it was discussed and finally adopted.

A report on the revision of the pharmacopœia was discussed and adopted; the question of weights and measures attracted particular attention.

Several papers were read, among others on "The coloring of medicines," by Aug. Drescher, and on "Pharmacy in Skin Diseases, by F. B. Kilmer.

Visits were made to several glass factories, and the visiting ladies enjoyed a drive through the city and suburbs.

Next year's meeting will be held in Jersey City. The officers elected for the present year are: President, Henry P. Thorn, Medford; vice-presidents, Charles P. Kinsella, Paterson, and F. R. Davis, Morristown; secretary, Charles F. Dare, Bridgeton; treasurer, William F. Townley, Newark.

The Tennessee Pharmaceutical Association met at Memphis, May 8th. The usual routine business was attended to. A prominent feature of the transactions was the pharmacy law which failed to pass the legislature. F. J. Dowdy, Memphis, was elected president; Secretary Thompson and Treasurer Laurent of Nashville were re-elected.

OBITUARY.

Warren de la Rue, D. C. L., F. R. S., died in London April 19, at the age of 74 years. He was a native of Guernsey, was educated in Paris, and succeeded his father as the head of the firm of Thomas de la Rue & Co., from which he retired in 1880. To scientific literature he contributed a number of papers on electricity and galvanism, a memoir on the coloring matter and other constituents of cochineal (1847), and with his friend Hugo Müller researches on hydrocarbons, resins, nitroglycerin etc., the memoir of special interest to pharmacy being one on some constituents of rhubarb (1857), in which the investigators proved the sediment formed in tincture of rhubarb to contain chrysophanic acid, erythroretin, phæoretin and aporetin, which compounds had been prepared (1844) directly from the root by Schlossberger and Doepping.

Oskar Schlickum died in Winningen near Coblenz April 4th, aged 51 years. He was born in the same town in 1838, received a good education, in 1856 became an apprentice in his father's pharmacy, and after clerking in several stores, passed the State's examination in 1865, and in the following year became the successor of his father. He was the author of a number of practical works, such as commentaries on the German pharmacopœias, condensed dictionaries of pharmacy, chemistry and botany, on the education of apprentices &c. His numerous practical papers were contributed to the *Pharmaceutische Zeitung* and to the *Archiv der Pharmacie*, and many of them are found, mostly as abstracts, in previous volumes of this journal. For about four years the deceased was chairman of the committee for the preliminary revision of the German pharmacopœia.

John Franklin Wilgus, Ph. G., class 1876, was killed May 5th, while crossing the tracks of the Pennsylvania Railroad at Bridesburg, Philadelphia, on the way to his place of business at 4627 Frankford Avenue; his remains were interred at Bordentown N. J.

Samuel S. Garrigues, Ph. G., Ph. D., deceased, at Ann Arbor, Michigan, after a protracted sickness, May 16th, 1889, in the sixty-first year of his age. Among the Huguenot exiles who left their homes in the province of Languedoc, in France, by reason of the revocation of the edict of Nantes by Louis XIV in 1685, were three brothers, Matthew, Francis and John De la Garrigue. Escaping from France they landed on the island of St. Christopher, (one of Caribbee group belonging to Great Britain), and from thence they afterwards made their way to Philadelphia. Uniting in religious creed with the Church of England the brothers became members of the congregation of old Christ's Church on Second street. (The first church building was erected in 1695. Watson's Annals of Philadelphia). Samuel, one of the children of Matthew, subsequently withdrew from the church, and with his family united himself with the Society of Friends. This was the great-great grandfather of the subject of our memoir. The family name in the course of time became anglicized to Garrigues. Samuel S. Garrigues was born at the N. E. corner of Market and Sixth streets, Philadelphia, September 7, 1828. His early education was received in the schools maintained by the Society of Friends. He afterwards entered the public schools of this city, and graduated from the High School in 1847. His knowledge of pharmacy was acquired in the store of his father, Edward B. Garrigues, Tenth and Fairmount Avenue, and with the late Frederick L. John, on Race street, above Third street. Graduating from the Philadelphia College of Pharmacy in 1851 he went the same year to Europe. After a year spent at the University in Berlin, he entered the University of Göttingen and, after a course of two years, graduated from that institution, receiving the degree of Ph. D. During the vacations of his student life abroad he made pedestrian trips through Germany and into Switzerland and Italy. Botany being one of his favorite studies, he collected during these excursions an extensive and valuable herbarium, which he afterwards presented to the University of Michigan.

Returning to Philadelphia in 1854, he engaged with Mr. Magee in the manufacture of chemicals for photography; the firm being known as Garrigues & Magee, on Fifth street above Arch street. After the dissolution of the firm in 1857 he removed to New York, where he remained until 1863, when the development of the salt interest in Michigan led to his connection with that industry as a chemist. In 1869, he was appointed State inspector of salt in Michigan, and held that office until his declining health made it necessary for him to withdraw from active duties. The reports prepared by him on the salt and lumber interests are valuable State papers on the resources of Michigan.

In 1864 he received a commission to act as assistant surgeon to the 29th Michigan Volunteers, and while the regiment was encamped in the State he was the only medical officer in charge. To malarial disease contracted at this time is attributed his subsequent declining health.

Dr. Garrigues became a member of the American Pharmaceutical Association in 1855, and while residing in Philadelphia was a member of the Franklin Institute and of the Academy of Natural Sciences.

After removing to Michigan he took an active interest in the advancement of Pharmacy in that State, was at one time president of the Michigan Pharmaceutical Association, and was interested in the passing of the Pharmacy Act of Michigan.

He was married in 1864 to Miss Addele M. Burt, of Saginaw, Michigan. His widow, a son and a daughter survive him.

The father of Dr. Garrigues, the oldest living member of the Philadelphia College of Pharmacy, resides in this city; he is now in his 93d year.

C. T. B.

THE AMERICAN
JOURNAL OF PHARMACY.

JULY, 1889.

ON RECENT IMPROVEMENTS IN THE METHODS FOR THE MANUFACTURE OF CHLOROFORM.

By Samuel P. Sadtler, Ph. D.

It is of course within the knowledge of the drug and chemical trade that along in the fall of 1885, a notable reduction in the price of chloroform took place, and that this reduction has been practically maintained since. Such a change indicates that either there has been a notable cheapening of the raw material of manufacture, a decided improvement in existing methods or the introduction of an entirely new method for the manufacture of the staple so cheapened. In the case of chloroform, it has been the latter.

The old process of manufacture by the action of bleaching powder upon alcohol has given way to what is now termed the "acetone" process. This is not, however, a new discovery. Liebig, in 1832, in following up his first account of the properties of the newly discovered "chloride of carbon" (chloroform), mentions that it can be gotten in very large quantities by the action of bleaching powder upon "pyroacetic spirit" (acetone) as well as from alcohol. That alcohol has all this time been preferred to acetone as a material from which to prepare chloroform, is due mainly to the fact that only in recent years has acetone been prepared pure in quantity, but also to the erroneous statement of Siemerling quoted in the works of reference like Watts' Dictionary of Chemistry that only 33 per cent. of chloroform could be gotten from acetone by the action of bleaching powder. Now that acetone is made on a large scale, and of extreme purity, and it has been shown that it is the richest chloroform-yielding substance known (206 per cent. by theory and 200 per cent. in practice at times), the case assumes a different aspect. Indeed, as was testified by one of the witnesses in the recent patent litigation on this subject (Michælis *vs.* Roessler), this process "is one of great importance to the manufacturers of chloroform, and of great value to the public for the reason that it enables the production of chloroform at a price which is nearly one-half its cost by any other method practiced by manufacturing chemists or known by me."

The writer, having had opportunity to thorougly study the new process in practice, desires to give an outline sketch of this recent revolution in the manufacture of so important a chemical as chloroform.

The manufacture of a purer grade of acetone than that then in use for solvent purposes having been begun in Germany in 1881 on the part of the "Verein für Chemische Industrie," Liebig's old suggestion for the manufacture of chloroform from acetone was taken up by the "Verein Chemischer Fabriken," Mannheim, Germany, in the beginning of 1882 and a year later by the first mentioned company which made the acetone for both. In June, 1884, Mr. F. Roessler of the present Roessler & Hasslacher Chemical Company, of New York, visited Germany and studied the process, which his company are now carrying out under the the patents of Gustav Rumpf to be described later. In the meantime Prof. G. Michaelis of Albany obtained in July, 1885, (application filed Nov. 18, 1884) a patent for distilling crude acetate of lime (preferably, as the patent says, crude "brown acetate of lime") and using the liquid products of their distillation in connection with a hypochlorite for the manufacture of chloroform. Under this patent suit was brought against Roessler & Hasslacher for infringement. After protracted litigation, Judge Butler of the U. S. Circuit Court has just decided that in using pure acetone alone the defendants were using an old and well-known process and were not guilty of infringement. As both the production of pure acetone and the method of manufacture of chloroform are covered by patents issued in this country, the processes can be given in outline as there published.

The raw material with which the beginning is made is the "gray acetate of lime." While this is distinctly purer than "brown acetate" it still contains both moisture and tarry matter. To free it from these and to raise the percentage of actual acetate of lime, it is carefully roasted before being submitted to dry distillation. This roasting forms the subject of patent No. 393,079, issued to Gustav Rumpf, of Frankfort, Germany, and assigned to Roessler and Hasslacher, of New York. As shown in Fig. 1, it is done in a series of three slightly-inclined cylindrical retorts, in which the material is continually pushed forward by revolving blades. The crude gray acetate is dropped in at *a* and passes along the length of the upper retort until it drops upon the blades which revolve in the second retort, and passing along this is dropped into the third or lowest retort, from which it issues at *g*, and is collected in suitable vessels. As seen in the illustration, the inclination of these three retorts is different, so that the material passes along most rapidly as it descends into the hottest retort below. At *e* and *f* are connections with the flue, through which the moisture and tarry vapors can pass off. By this continuous roasting process, the crude material can be purified without notable decomposition of the true acetate. The second patent, No. 385,777, issued to the same and assigned to the same, refers to the method of distilling the roasted gray acetate. Here, to secure the maximum yield of acetone, the points to be attained are uniformity of temperature throughout the whole mass and slow heating to not over 300° C. The patentee claims that "in the process of subjecting acetates in a closed vessel to heat applied externally to the vessel for distilling acetone from the acetates, the desired slowness and uniformity of temperature may be

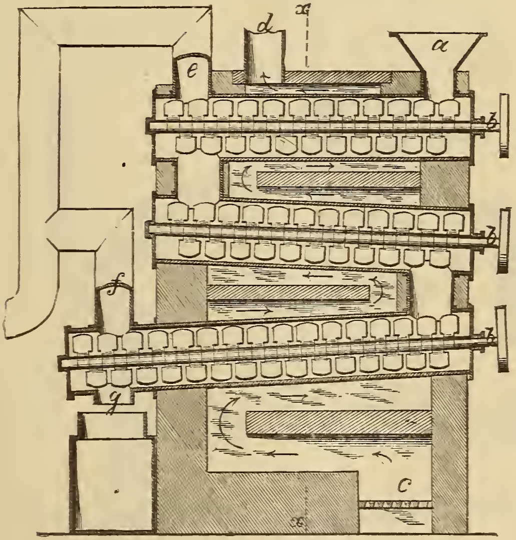


FIG. 1.

secured by stirring the acetates so that all portions of the mass will be subjected to the heat resulting from direct contact with the bottom of the vessel and by admitting free steam from time to time into direct contact with the acetates in case of any undesirable rise in temperature within the vessel."

Fig. 2 shows the form of retort in which this is effected. It will be seen mechanical agitation is provided for by the paddles which rotate around the vertical central axis. Steam is admitted by one of the openings above, while the products of distillation pass off by another opening in the top of the retort. The crude acetone distillate so obtained while richer than before in real acetone still contains oily distillation products and much water from condensed steam. In this dilute state it is treated with milk of lime to remove the higher ketones and other compounds. It is then distilled from a large plain still and the fractions rich in acetone passed to a column-still where it is rectified until it becomes almost if not quite anhydrous. In practice, two column-still rectifications are carried out, one after the other, so that the pure acetone shows 99° or 100° by the alcoholometer. It is now fitted for use in the direct manufacture of chloroform. The

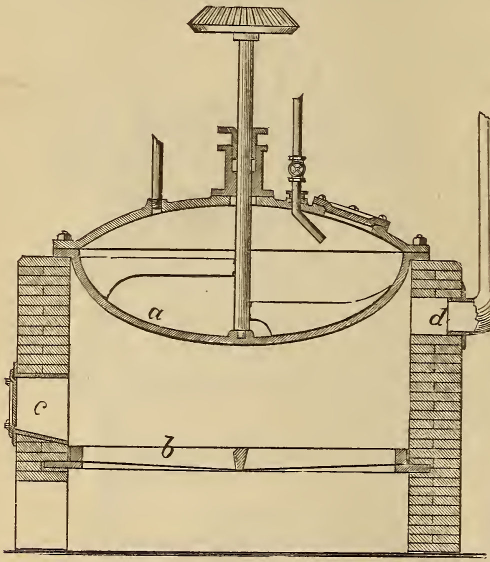


Fig. 2.

process and form of apparatus for most successfully carrying out this chloroform manufacture constitute the subject of U. S. patent, No. 383,992, also issued to G. Rumpf, and assigned to Rœssler and Hasslacher. The patentee first states that in order to get the full yield of chloroform it is necessary to take a much larger proportion of bleaching powder than that given in Watts' Dictionary of Chemistry, Vol. I., page 918, and states that for 58 pounds of acetone at least 600 pounds of chloride of lime of thirty-five per cent. available chlorine are necessary. The yield will then be from 150 to 180 per cent. of the weight of the acetone employed instead of about 33 per cent.

The construction of the still and connections are shown in Fig. 3. The still having been filled to a proper height with water, as shown in the cut, the charge of bleaching powder is introduced and the manhole *c* closed with cement. The agitators having been started by means of the revolving shaft *b*, the acetone, previously diluted, is pumped in gradually at *i*. As it enters, it rises and reacts with the bleaching powder solution and the chloroform produced distills spontaneously from the delivery tube *d*, passes through the condenser *e* and is collected under water at *f*. The introduction of the diluted acetone is to be effected at intervals only, otherwise some acetone will distill over unchanged, or the reaction will become too violent and much frothing ensue. When the delivery of chloroform begins to slacken, steam is gradually introduced to heat up the mixture and drive over the last portions of the chloroform which remain. The contents of the still are then discharged through the outlet *k* into the drain. They consist of very dilute calcium acetate solution mixed with calcium hydrate and calcium chloride.

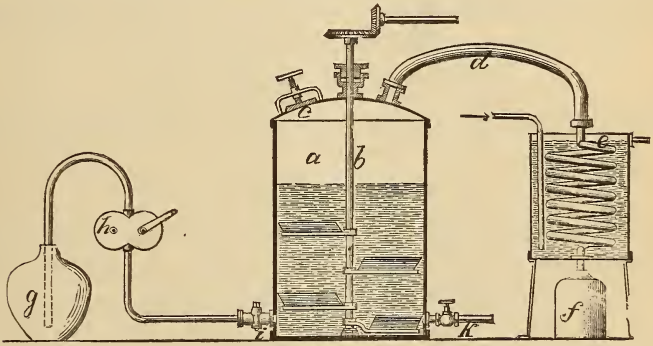


Fig. 3.

The reaction for this production of chloroform from acetone seems to be simply:

$$2C_3H_6O+6CaOCl_2=2CCl_3H+Ca(C_2H_3O_2)_2+2Ca(OH)_2+3CaCl_2.$$

This would demand one equivalent of chloroform for one of acetone used, or 206 parts of chloroform by weight reckoned on the weight of the acetone. In practice 180 parts are usually obtained, although 200 parts have actually been obtained at times.

The chloroform obtained is quite free from the chlorinated side products which often accompany the chloroform made from alcohol. It is, nevertheless, thoroughly purified by treatment with sulphuric acid and careful washing, and it is then brought exactly to the U. S. Pharmacopœia standard.

HYPOPHOSPHOROUS ACID AND THE OFFICINAL HYPOPHOSPHITES.

By Frank X. Moerk, Ph. G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 55.

I. METHODS OF ESTIMATION.

In taking up the above subjects for examination, the renown of hypophosphorous acid and its salts as reducing agents rendered it very likely that abundant evidence of this property would be had in finding the acid and its salts changed, partly at least, into phosphorous acid and phosphites, consequently, the determination of these last bodies in presence of the former was of considerable importance.

Looking over the reactions of the two acids there are to be found only three tests by which hypophosphorous acid can be distinguished from phosphorous acid, and, possibly, only one by which phosphorous acid can be distinguished from hypophophorous acid. Hypophosphites: 1, heated with cupric sulphate solution give a precipitate of cuprous hydride which, on boiling, is decomposed into metallic copper and hydrogen[1]; 2, with a nitric acid solution of ammonium molybdate produce no change until a few drops of sulphurous acid are added, when a beautiful blue color results[2]; with ammonium tungstate, under same conditions, also a blue color[3]; phosphites, in presance of acetic acid, cause a white precipitate with lead acetate.[1] These tests, however, appear to be valueless for quantitative estimations.

---

[1] Wurtz: Elements of Chemistry.

[2] Amer. Journ. Phar., 1889, 129.

[3] Amer. Journ. Phar., 1889, 130.

To estimate hypophosphites the same methods[2] are recommended as for the estimation of phosphites; they are two in number: 1, Conversion of the acids or salts into phosphoric acid or phosphate, estimating this and calculating then to the acid or salt used; 2, Determination of the reducing action by use of mercuric chloride in excess, weighing the mercurous chloride formed, and calculating to original substance. While these methods give good results, if working with pure substances, no mention is made of the determination of both in a mixture.

By carefully studying these two methods the following process was devised, for a correct understanding of which the essential reactions are first given:

$$H_3PO_2+4HgCl_2+2H_2O=H_3PO_4+2Hg_2Cl_2+4HCl \text{ and}$$
$$2H_3PO_3+4HgCl_2+2H_2O=2H_3PO_4+2Hg_2Cl_2+4HCl.$$

It will be seen that hypophosphorous acid, H_3PO_2, has twice the reducing action of phosphorous acid, H_3PO_3; hence, should H_3PO_3 be present with H_3PO_2, two molecules H_3PO_3 will always be expressed as one molecule H_3PO_2. By oxidation, however, the two molecules of H_3PO_3 will form two molecules of H_3PO_4, which by the first method will then be calculated as two molecules of H_3PO_2; so by this determination a larger amount of H_3PO_2 will be obtained compared with that found by the reducing action, and this excess will represent one molecule of H_3PO_2 formed from two molecules of H_3PO_3; the calculation as H_3PO_3 can then be made by the proportion:

$$H_3PO_2 : 2\,H_3PO_3 :: \text{the difference} : x.$$

A better method of determining the reducing action it was thought could be found by using an acid solution of permanganate of potassium; this method[3] has at various times been mentioned as a good one for the estimation of hypophosphites, but matters apparently rested with the mentioning, as no account of the details could be found after a careful search. In the following experiments calcium hypophosphite was used; the $K_2Mn_2O_8$ solution was made by dissolving 5 gm. in a liter of distilled water, and this solution was standardized by means of the normal solution of oxalic acid. From 0·1 to 0·2 gm.

---

[1] Fresenius: Qualitative Analysis.

[2] Watts' Dictionary of Chemistry.

[3] Amer. Journ. Pharm., 1882, 138 and 1887, 246.

$Ca(H_2PO_2)_2$ were dissolved in 50 cc. water, 10 cc. dilute sulphuric acid (1–5) added, and the $K_2Mn_2O_8$ allowed to run in from a burette; at first decolorization occurred, but after about one-half of the calculated $K_2Mn_2O_8$ had been added the solution became of a red color, and then rapidly, on further addition, deposited a dark brown precipitate of hydrated manganese dioxide. Repeating this experiment a number of times with larger quantities of sulphuric acid, also by application of gentle heat, no better results were obtained. Thinking that the reducing action would progress more favorably, if a ferric salt was present, in that this would be reduced to ferrous salt which, by addition of $K_2Mn_2O_8$, could be easily oxidized to the ferric condition, an addition of an excess of ferric sulphate solution was made, and after boiling and allowing to cool somewhat the $K_2Mn_2O_8$ added; the results obtained by this modification did not differ materially from those previously mentioned. It may be opportune to here mention the peculiarity of hypophosphorous acid; it is a good reducing agent toward permanganate of potassium and ferric salts, until by this action it has been changed into phosphorous acid, then this acid reduces permanganate only to the condition of hydrated manganese dioxide, the ferric salt, even upon boiling, being very slowly, if at all, reduced by it. The proof of this last assertion was obtained by boiling the hypophosphite with ferric chloride in moderately dilute acid solution until no further decolorization took place, then adding an excess of ferric chloride (sufficient to impart a decided color) and boiling for one hour; by addition of ammonia the iron was precipitated; the filtrate strongly reduced mercuric chloride and silver nitrate solutions; the washings of the precipitate for a long time reduced silver nitrate, indicating the presence of a salt of a reducing acid which could only be a phosphite; the precipitate was dissolved in nitric acid and solution of molybdate of ammonium added, after heating for some time to 40°C. the mixture deposited so little precipitate, that it was possibly due to a small quantity of phosphite, which was not completely removed by washing, and which, by the action of the nitric acid, was converted into phosphate. From these experiments the formation of phosphoric acid from hypophosphorous acid does not take place until the hypophosphorous acid has been completely converted into phosphorous acid.

After understanding the peculiarities of the two acids, and their salts, the following manipulation gave very good results with $Ca(H_2PO_2)_2$: 0·1 to 0·2 gm. are dissolved in 50 cc. water, 10 cc. dilute sulphuric acid and sufficient $K_2Mn_2O_8$ added until the liquid above the precipitated hydrated manganese dioxide has a distinct purple color; the mixture is heated to 60°C. for one-half hour, should the supernatant liquid become colorless more $K_2Mn_2O_8$ must be added. By addition of a measured quantity of normal oxalic acid solution the excessive $K_2Mn_2O_8$, as well as the MnO_2 H_2O, is reduced and a colorless liquid results; to this is now added sufficient $K_2Mn_2O_8$ to produce a permanent pink color. From the total $K_2Mn_2O_8$ added is subtracted that quantity which is required by the oxalic acid, the remainder being the quantity necessary to oxidize the hypophosphite.

$$\underset{850}{5Ca(H_2PO_2)_2} + \underset{1264}{4K_2Mn_2O_8} + 12H_2SO_4 = 5CaH_4(PO_4)_2 + 4K_2SO_4 + 8MnSO_4 + 12H_2O.$$

$$\underset{630}{5H_2C_2O_4.\ 2H_2O} + \underset{316}{K_2\ Mn_2O_8} + 3H_2SO_4 = 10CO_2 + 18H_2O + K_2SO_4 + 2MnSO_4.$$

316 parts	$K_2Mn_2O_8$	are	the	equivalent	of	630.0	parts	$H_2C_2O_4.2H_2O$
"	"	"	"	"	"	212·5	"	$Ca(H_2PO_2)_2$
"	"	"	"	"	"	165·0	"	H_3PO_2
"	"	"	"	"	"	260·2	"	KH_2PO_2
"	"	"	"	"	"	220·0	"	NaH_2PO_2
"	"	"	"	"	"	209·1	"	$Fe_2(H_2PO_2)_6$

While with $Ca(H_2PO_2)_2$ very good and constant results were obtained, the method applied to the examination of KH_2PO_2 and NaH_2PO_2 was not very satisfactory, this being probably due to the presence of chlorides in these salts; the test carried out in neutral and alkaline solutions gave no better results.

The mercuric chloride method was now the one which had to be relied upon for the reducing action in all cases; some experiments were made to find the best conditions. If mercuric chloride, in excess, be added to a neutral solution of a hypophosphite there is formed, in the cold, slowly a precipitate of mercurous chloride, heating promotes the precipitation, but even then it requires several hours for complete precipitation; the addition of 1 per cent. HCl hastens the precipitation which is complete after heating in a waterbath for thirty to forty-five minutes; the presence of 15 per cent. HCl causes the greater part of the reduction to take place in the cold in a few minutes, but heating in a waterbath for twenty to thirty minutes is essential for complete precipitation. As Hg_2Cl_2 is liable to change by heating with moderately strong HCl, the following manner of employing the test was used: 0·2 to 0·3 gm. of the hypophosphite were dissolved in 25 cc water (ferric hypophosphite formed an exception to this method; for details see that compound), 1 cc HCl and 75 cc of a saturated solution of mercuric chloride added, heated in a waterbath for 45 to 60 minutes, filtered through a weighed filter, and the filtrate heated to the boiling point for several minutes; if no further precipitation takes place, the precipitate is well washed with boiling water, dried at 100° and weighed. Should a precipitate form the heating must be continued for fifteen minutes and filtration repeated. A large number of determinations made by this method did not furnish a single case in which a second precipitation occurred.

The weight of mercurous chloride multiplied by the following factors (obtained by writing the reactions and dividing the molecular weights of the hypophosphites by the amount of Hg_2Cl_2 formed from them), will give the amount of the hypophosphite:

For	H_3PO_2	multiply	by	0·070183
"	NaH_2PO_2	"	"	0·093577
"	KH_2PO_2	"	"	0·110697
"	$Ca(H_2PO_2)_2$	"	"	0·090387
"	$Fe_2(H_2PO_2)_6$	"	"	0·088934

The second part of the determination consists in oxidizing the hypophosphite and estimating the phosphoric acid formed; experiments proved that bromine is the best oxidizing agent that can be used. From 0·2 to 0·3 gm. of the hypophosphite are dissolved in 50 cc. water, a few drops bromine added and, after covering the beaker, moderate heat applied; should the solution become colorless, more bromine must be added and the heating continued; after the solution has retained the bromine color for half an hour, it is heated to the boiling point, and by occasionally lifting the cover the bromine vapors are allowed to dissipate. An excess of ammonium hydrate is now added, and if a precipitation of phosphate occurs (as there will be if the calcium or ferric salt has been used or, if in the preparation of the alkaline hypophosphites all of the calcium salt was not decomposed) an ammoniacal solution of ammonium citrate is added to redissolve the precipitate before the addition of magnesia mixture is made. From the weight of the magnesium pyrophosphate the hypophosphite can be calculated by use of the factors:

For	H_3PO_2	multiply	by	0·5946
"	NaH_2PO_2	"	"	0·7928
"	KH_2PO_2	"	"	0·9378
"	$Ca(H_2PO_2)_2$	"	"	0·7658
"	$Fe_2(H_2PO_2)_6$	"	"	0·7534

It is to be understood that if the salt examined contains phosphoric acid or phosphate this must be determined, and the amount of magnesium pyrophosphate due to it subtracted from the total magnesium pyrophosphate before the above calculations are made.

In writing out the reactions for the oxidation of hypophosphites and phosphites by means of bromine, it was noticed that by neutralizing with sodium hydrate, results identical with those from the reduction method with mercuric chloride were to be obtained.

$$NaH_2PO_2+(Br_2)_2+2H_2O=NaH_2PO_4+4HBr$$

$$2Na_2HPO_3+(Br_2)_2+2H_2O=2Na_2HPO_4+4HBr.$$

Both reactions yield products which will require for neutralization six molecules sodium hydrate; and, as in the case of the mercuric chloride method, two molecules phosphite will be calculated as one molecule hypophosphite. Should phosphite be present the hypophosphite deduced from the phosphoric acid determination will exceed that found by this volumetric method, the excess representing one molecule hypophosphite derived from two molecules phosphite.

This method will allow of a rapid determination of the reducing value and at the same time prepare the solution for the phosphoric acid estimation, thus combining the essential points in the analysis of the hypophosphites. The determination is effected as follows: 0·2 to 0.3 gm. of the hypophosphite are mixed with 100 cc. water in a covered beaker and bromine added, a few drops at a time, until the color no longer disappears even after application of a moderate heat; the excess of bromine is removed by boiling the solution until free from color (no fear need be entertained of a loss of acid as a very dilute acid solution, such as this, loses upon boiling only water until the acid becomes so concentrated as to contain 47 per cent. HBr), 15 cc. of a *neutral* 10 per cent. calcium chloride solution and a few drops of phenolphthalein solution added and then titrated with normal sodium hydrate. By multiplying the number of cc. of NaOH required by the following factors, which represent the quantities of hypophosphites corresponding to 1 cc. NaOH, the quantity of hypophosphite will be obtained:

For $Ca(H_2PO_2)_2$ multiply by 0·014166
" NaH_2PO_2 " " 0·014666
" KH_2PO_2 " " 0·016850
" $Fe_2(H_2PO_2)_6$ " " 0·013940

The sodium hydrate solution must be accurately standardized as a slight error will make a considerable difference if expressed as percentage of hypophosphite.

The addition of the calcium chloride is made to correctly indicate the reaction of the solution; phosphoric acid titrated with sodium hydrate solution will indicate an *alkaline* reaction before all of it has been changed into Na_2HPO_4, although this is an *acid* salt; by the addition of $CaCl_2$ there is formed the *acid* salt, $CaHPO_4$, which has an *acid* reaction, and which by addition of NaOH is changed into the normal calcium phosphate with neutral reaction.

This method must only be applied in neutral solutions; should the hypophosphite have an acid or alkaline reaction, the amount of acid or alkali required to neutralize must be ascertained and allowed for in the above method. For this reason hypophosphorous acid was not placed in the above list; its estimation is easily effected by subtracting the number of cc. of NaOH required for neutralization of the acid from the total number of cc. of NaOH required after oxidation with bromine and multiplying the remaining number of cc. of NaOH by 0·011.

The change of a pure hypophosphite into a phosphite must be attended by the production of an acid reaction for the reason that H_3PO_2 is a monobasic acid while the product of oxidation, H_3PO_3, is a diabasic acid, hence, a pure hypophosphite will not be able to neutralize the additional acidity. In the examination of hypophosphorous acid, the neutralization figures play an important part.

After using the various methods it is but proper to recommend the one found to be the best; this is undoubtedly the volumetric method after oxidation with bromine, for as accurate results as with the mercuric chloride method are obtained in one-fourth of the time. For a method to be carried out in a retail store, possibly the mercuric chloride would answer better as there are no objectionable vapors generated.

In the examination of the hypophosphorous acids and the hypophosphites probably more determinations were made with the mercuric chloride method, owing to the fact that most of the work had been done before the value of the volumetric method was recognized.

AN OLD SAMPLE OF CAMPHOR OIL.

By Henry Trimble and Hermann J. M. Schroeter.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 54.

Since the publication of our paper on oil of camphor in the June number of this Journal, page 273, we have been supplied with a sample which was bottled by the late Frederick Brown more than 50 years ago. At that time it was put up in 2 drachm bottles and sold at a high price for internal use. This sample resembled in physical properties the one exhibited by Prof. J. M. Maisch at the last pharmaceutical meeting (see page 315), and it is probable that both samples correctly represent the character of the oil imported at that time.

The sample from Mr. Brown which we will mark No. IX, had a deep yellow color, and possessed a pleasant camphoraceous odor. It began to boil at 178° C., had a sp. gr. of 0·9467 at 16° C., and possessed strong dextro-rotary power =+66·2° with a 200 mm. tube.

A 5 per cent alcoholic solution of the oil gave with 5 drops of saturated alcoholic solution of ferric chloride a green coloration. This coloration, we have since found, was also produced in the above proportions with oils I and II of our last paper, which however rapidly faded with sample No. I, while with No. II, it was more decided.

About 4 per cent. of camphor had crystallized out, and on cooling to somewhat below 0° C., the oil formed a mass of separated camphor. On distillation, this oil gave quite different results from any of the other samples examined.

One half litre was subjected to fractional distillation in a vacuum. When 25 per cent. had distilled over, camphor separated out, and continued so, until about 25 per cent. of the oil still remained in the *distilling* flask. On redistillation, the oil was found to contain the following definite fractions (the numbers correspond with those of the fractions of oil No. 1, page 282), in quantity as given:

		Boiling point.	Per cent.
(2).	From 158°–162° C.	159° C.	6·00
(3).	“ 167°–169° C.	168° C.	9·00
(4).	“ 170°–172° C.	171° C.	2·00
(5).	“ 175°–177° C.	176° C.	11·00
(6).	“ 180°–182° C.	180° C.	2·00
(7).	“ 202°–206° C.	204° C.	52·00
(8).	“ 212°–215° C.	213° C.	15·00
(11).	“ 250°–270° C.		3 00

The lighter fractions of this oil are identical in boiling points with those obtained from No. 1 oil of our last paper, with exception of fraction (1) which was entirely absent; these lighter fractions however, exist only in one-half the quantity.

The large percentage of camphor is due no doubt to the ageing of the oil, having probably been originally present as the compound (8), camphorogenol. This compound (8) exists now in the oil to only one-half the amount it was present in No. I oil. Fraction (9), safrol, and (10), eugenol, could not be detected in this sample by any of the methods used for obtaining these compounds from No. I oil. A portion of the oil when shaken with concentrated aqueous solution of potassium hydrate, showed no separation of eugenate of potassium, and on addition of a mineral acid to this mixture, no odor of eugenol was developed. The odor of safrol was not detected in any of the methods used for treatment of the higher boiling fractions.

Fraction (11) possessed not the greenish blue color as from No. I oil, but had a very deep yellow color. It, however, gave Wallach's reaction for a sesquiterpene, with glacial acetic and concentrated sulphuric acids. The greenish blue oil detected in samples I and II was entirely absent from this sample. This fraction gave with an alcoholic solution of ferric chloride a brownish green coloration. This however was not due to eugenol, since we had evidence of its absence. (11) from No. I oil also gave this greenish coloration. Alcoholic ferric chloride added to fraction R, eugenol, from No. I oil, gave a blueish green coloration, which was decidedly different from that produced with fractions (11).

Fractions (2) to (6), inclusive, are no doubt identical with those obtained from No. I oil with the same boiling points, since their action on polarized light proved to be about the same.

The polariscope readings for (2), (3) and (5) with the 200 mm. tube were as follows, compared with No. I oil:

		No. IX Oil.	No. I Oil.
(2).	From 158°–161° C.	+54·2°	+54·°.
(3).	" 167°–169° C.	+57·2°	+56·9°.
(5).	" 175°–177° C.	+62·2°	+62·4°.

The absence of safrol and eugenol was also indicated by the strong dextro-rotary power this sample exerted on polarized light, being similar to samples III, IV and V, all of which consisted of a solution of camphor in the light fractions of camphor oil. This sample of oil of camphor resembled the three last-named ones most, the difference being a larger percentage of camphor, with the addition of (8) camphorogenol, and (11), both in comparatively small amount only.

PHILADELPHIA, June 3d, 1889.

ABSTRACT OF REPORT PRESENTED BY COMMITTEE ON ADULTERATIONS AND DETERIORATIONS TO THE PENNSYLVANIA PHARMACEUTICAL ASSOCIATION.

A number of students in the Chemical Laboratory of the Philadeldelphia College of Pharmacy contributed their time to obtain some of the following results:—

Mr. Wm. Handler examined six samples of *Simple Syrup*, five of which were found close to the officinal requirements and one was decidedly inferior, containing only forty per cent. of sugar.

Mr. Charles A. Schwacke assayed light samples of *Household Ammonia*. This commercial article contained from 3.72 to 10 per cent. of ammonia—NH_3. Two of the samples contained borax.

Mr. Harry S. Wood determined the strength of *Glacial Acetic Acid*, and found two qualities in the market under that name, one containing about 80 and the other 99 to 100 per cent. of the absolute acid. The latter strength can always be gotten, generally with the percentage on the label, if the pharmacist is willing to pay the price. The absolute acid is easily recognized by its power to dissolve an equal volume of oil of lemon.

Mr. Charles E. McCloskey found powdered *Belladonna Root* from different wholesale druggists to yield from 0.2 to 0.4 per cent., and the *Leaves* 0.04 to 0.24 per cent. of alkaloid.

Mr. A. G. Hostetter, noticing the statement frequently made that *Potassium Tartrate* is often impure or adultrated, found all the samples from the manufacturers in this State to be very good, containing only traces of calcium salts, sulphuric, hydrochloric and carbonic acids.

Mr. G. M. Grosse found *Reduced Iron* to be of poor quality, one sample only answering to the requirements of the Pharmacopœia. They ranged from 18.43 to 88.40 per cent. The highest being of German and the lowest of French manufacture. Those of American make, being obtained from stock bottles of retail pharmacists, had, no doubt, deteriorated by frequent exposure to the oxidizing action of the air.

Mr. O. Y. Owings determined the *Sodium Carbonate* and *Bicarbonate* of commerce to be of good quality, there being little or no difference between the English and American brands.

Mr. H. J. M. Schrœter (AM. JOUR. PHARM., December, 1888) has also shown that the commercial bicarbonate responds to the requirements of the Pharmacopœia for a pure salt.

Mr. Joseph Lowenberg examined five samples of *Morphine Sulphate*. All were found to be pure, but an English sample contained only 6·94 per cent. of water of crystallization, instead of 11·87 per cent. as allowed by the Pharmacopœia. A sample of *Morphine Acetate* was not easily dissolved in water, and yielded 1·81 per cent. of residue on ignition.

Mr. S. A. Wagaman assayed five samples of ¼-grain *Granules of Morphine Sulphate.* Finding that a small quantity of morphine was lost in the assay, he used as a check the amount of sulphuric acid found. In this way higher results were obtained than by the morphine assay, but still below what should have been in the samples. A single granule should contain ¼ or $\frac{25}{100}$ of a grain, there were found 20, 22, 18, 21, and 17 one hundredths of a grain respectively in the five samples. One hundred granules should contain 25 grains of morphine sulphate, but one sample only weighed 32 grains with the coating, two others weighed 36 grains each, thus showing that quality was sacrificed for elegance. These assays, which were repeated as well as compared with one made on a weighed quantity of the salt mixed with gum and sugar, indicate that pharmacists should exercise great caution in buying these granules.

Mr. Clarence S. Eldredge investigated the quality of twenty-five samples of *Lime Water* purchased of retail pharmacists in Philadelphia, and its vicinity. The results indicate gross carelessness in the making and keeping of this important preparation. Eight of the samples contained 0·15 per cent. of calcium hydrate, and were, therefore, equal to the pharmacopœia requirements, eight more were nearly up to the standard, and the remaining nine rapidly descended on the scale of strength to two which failed to show any alkaline reaction by litmus paper.

Four samples of *Balsam of Copaiba* were examined, one responded to all known tests of purity; two by the U. S. P. test showed gurjin balsam, one of these also contained turpentine; the fourth sample was of a character that indicated adulteration, without one being able to determine exactly the nature of the admixture.

A sample of *Yellow Wax* was found to contain 50 per cent. of paraffin, thus indicating that this old trick has not been forgotten.

The adulteration of certain kinds of *Cream of Tartar* has nearly come to the point of being a recognized business. A sample from Altoona consisted largely of calcium phosphate. It scarcely charred when heated, thus indicating the absence of an organic substance like tartaric acid. Two samples from Pittsburgh did not char on heating, and were found to consist of calcium sulphate and phosphate.

One of the most glaring examples of willful substitution was some *Blue Ointment*, which by private information as well as chemical examination was found to be lard colored with Prussian blue.

Seventy-seven samples of *Laudanum* representing all parts of the State as well as New York City and Baltimore were assayed. Four were of full officinal strength. Nine more were near enough to come within the limits of reasonable error, and five failed to yield a weighable amount of morphine. The remaining fifty-nine may be classified as bad. Nearly all the poor samples were either the bottled preparation from country stores, or from manufacturers who supply this trade.

HENRY TRIMBLE, Philadelphia.
CHAS. D. LIPPINCOTT, Titusville.
T. W. LASCHEID, Pittsburgh.
Committee.

ON PHARMACEUTICAL ASSAYING.

BY AUGUST DRESCHER, PH. G.

Read before the New Jersey Pharmaceutical Association at Bridgeton, May 22.

It had been, originally, the intention of the writer, he well recognizing the importance of this branch of pharmacy, to contribute a series of papers on the subject of assaying crude drugs and their preparations, and, in this spirit, work was forthwith begun in his own laboratory, regular notes of personal observations being made and kept, the current literature on the matter being at the same time duly recognized, appreciated, and utilized, as a matter of course. The subject was to be treated of in regular classic order, and the first to be considered was to be "*Narcotica et similia.*" I had the pleasure at our last year's meeting to bring my first contribution on "Opium and its preparations." It has since that time, however, been impossible for me to continue, as originally intended, this systematic work, owing to many disturbances, and so,—though very reluctantly,—I, for the time, have had to abandon it, to be taken up again with renewed vigor, however, as soon as time and opportunity shall permit.

The present paper will confine itself to the discussion of some drugs and preparations, with which the writer has been kept busy during the past year. In some of these cases the U. S. P. does not offer "tests," but the law allows the Board of Health to enforce conformity to some other standard in such a case, as, *e. g.*, United States Dispensatory, National Dispensatory, or even any other well qualified authority.

Paregoric, U. S. P.—Prepare a "standard" (strictly U. S. P., using standard ingredients!) for comparison with the suspected sample through the following tests:

1. *Acidity.*—20 cc. of sample dilute with 20 cc. diluted alcohol, titrate with $\frac{1}{10}n$NaHO solution, using phenolphthalein as indicator (*Drescher*). Standard paregoric, U. S. P., 1880, will consume 7–8.5 cc. $\frac{1}{0}n$NaHO.—*N. B.* A blank experiment with the diluted alcohol, used in the preparation, may be made, and allowance made for possible acidity of it.

2. *Sp. gr.* is approximately 0·925 to 0·935 (*Drescher*).

3. *Morphiometric assay* is not practicable.

4. *Meconic-Acid Determination*:—Allen's colorimetric method (especially for U. S. P. article) yields uncertain results. Drescher's modification yields fair results, thus: Evaporate 20 cc. of sample on water-bath with 1 gm. freshly ignited kaolin to 10 cc., filter, dilute filtrate with water to 20 cc., add 3 drops 10 per cent. ferric chloride solution, and compare coloration with that of the standard equally treated (*Drescher*).

5. *Foreign Colors*:—Caramel, red santal, cochineal are commonly employed; cudbear rarely. Solution of basic lead acetate precipitates cochineal, santal, and cudbear. The precipitate may be freed from lead by means of dilute sulphuric acid, and the color taken up by a suitable solvent and further tested. Caramel is best precipitated by kaolin (freshly ignited), shaken out with water, and evaporated, or, the tincture may be directly evaporated down, and the caramel found in the residue, as a black or brown, viscid, sweetish mass, after

washing with strong alcohol. Cochineal and caramel are insoluble in stronger ether, cudbear is slightly soluble, and santal-red is easily soluble. Caramel is insoluble in strong alcohol.

The colors can be further tested with diluted sulphuric acid; cochineal turns yellow, cudbear and santalum do not turn, or only very gradually. Caramel is not affected, but it is otherwise easily distinguished.

Any color fairly above that of the regular light-brown of the standard ought to condemn an article, so that the special examination for colors might be omitted.

6. *Amount of Alcohol.*—Dilute 50 cc. with 100 cc. water, add 3 gm. recently-ignited kaolin, filter in closed funnel (to rid of oil anise, etc., etc.), distil off 50 cc. and determine as usual.

N. B.—The distillate may still contain a little camphor, etc., but not enough to seriously affect the sp. gr. of it (*Drescher*).

Rhubarb.—Of the structural and general physical characters of the *whole* root it is needless *here* to "waste eloquence," while the "text books" are so elaborate in their description of this drug; but the "*powdered*" root merits special attention here.

1. *The physical properties* ought, of course, be noted, as compared with a sample of undoubted quality—best self-prepared.

2. *Amount of Extract*—(prepared with 45 per cent. weight alcohol) ought to be about 47 per cent. (*Hager*); 35–58 per cent. (*Drescher*), *minimum* and *maximum*.

3. *Ash.*—12–14 per cent. (*Drescher*); sometimes claimed to be much more (*e. g.*, 43 per cent. (?) Nat'l Disp.[1]).

4. *Chrysophanic acid.*—To be not less than 3 per cent. (*Hager*); 2·5 per cent. (*Drescher*).

5. *Foreign coloring matters.*—These are easily detected, according to their nature (aniline, coal-tar derivatives, curcuma, etc.); thus: anilines (or other coal-tar derivatives) may be shaken out with benzol, or other solvents, etc. Curcuma is certainly discovered by the methods proposed by Maisch and Howie [see *U. S. Disp.*, *Nat'l Disp.*, *Hager's Phar. Praxis*, etc.].

6. *Chrysophanic acid.*—10 grammes coarsely powdered rhubarb is

---

[1] 43.27 per cent. See *Pharmacographia*, 1st Edition, page 449; 2d Edit., p. 500.—Ash 3 to 43 per cent.; *Marmé*, *Pharmacognosie*, 1886, p. 86.—Aschengehalt steigt bis 40 pro cent., *Moeller*, *Pharmakognosie*, 1889, p. 319.—Editor AM. JOUR. PHAR.

to be extracted with about 100 cc. absolute alcohol, containing 4 per cent. of concentrated soda-solution, by means of gentle heat; evaporate to one-quarter volume, acidify with acetic acid, and exsiccate; the triturated residue is extracted with cold benzol. On evaporating this benzol solution the chrysophanic acid (with a little resin) will be in weighable condition.—*Method Hager.*

Exhaust the rhubarb with cold water, evaporate the solution, dry the residue, extract with benzol, evaporate the benzol solution, which on cooling, etc., will deposit the chrysophanic acid.—*Method Schlossberger.*

Take 5 grammes finely-powdered rhubarb, 1·5 grammes tartaric acid, mix thoroughly, introduce into a Tollen's apparatus, and repercolate with 50 cc. of chloroform at about 65–70° C., evaporate, take up with chloroform, evaporate and weigh as "chrysophanic acid."—*Method Drescher.*

N. B.—These methods, *all and each*, do not claim to isolate the pure "chrysophanic acid," but they are, nevertheless, serviceable enough for practical purposes.

Jalap.—We are all familiar with the U. S. P. process of preparing "Resina Jalapæ." We use it for assaying this drug, which owes its activity to the amount of resin in it. I have made numerous assays of jalap, but the U. S. P. method has often not given me satisfaction. The resin will sometimes not separate for days out of the water. I use the following method, devised by me: 5 grammes (No. 50 powder) jalap are mixed with an equal quantity of fine sand; transfer to a filter, add gradually 250 cc. of boiling water, keeping the filter in a hot water jacket; after draining and drying the filter, remove the dregs therefrom, cut out the residue-ringed zones of the filter, add to the dregs, digest the whole with 150 cc. hot alcohol, filter, wash filter with a little hot alcohol, evaporate filtrate to small bulk, transfer to small beaker, evaporate to dryness and weigh. The resin is then further tested as usual for its purity. (See U. S. P.) The U. S. P. claims 12 per cent. of resin, the Ph. Germ., 10 per cent. as a minimum; both figures are too high for the jalap of our commerce. The highest I have found is 8.5 per cent.[1]

NEWARK, N. J., May, 1889.

---

[1] Two of the eight samples of jalap assayed by Mr. W. L. Turner yielded 10.36 and 19 per cent. of resin.—AM. JOUR. PHAR., 1888, p. 379; see also *Ibid.* 1887, 321–327).—EDITOR.

INFUSION OF DIGITALIS.

By Joseph W. England, Ph. G.

From a paper read before the Pennsylvania Pharmaceutical Association, June 5.

In the introductory portion of his paper, the author refers in detail to the chemical researches on digitalis, and lays stress upon the fact that the active constituents may be divided into three groups. First, those soluble in alcohol and insoluble or nearly insoluble in water; second, those soluble in water and insoluble or nearly insoluble in alcohol; third, those soluble in both alcohol and water. Under the first group are placed digitalin and digitoxin; under the second digitonin; under the third, digitalëin. The tincture and fluid extract being alcoholic or rather dilute alcoholic preparations, contain most largely, digitalin, digitoxin and digitalëin, whilst the infusion, an aqueous preparation, holds in solution digitonin and digitalëin. It is evident from these facts, comments the author, that the custom of making infusion of digitalis from the tincture or the fluid extract, needs to be mentioned only to be condemned, and should never be followed.

To determine the value of an infusion of digitalis the first step would be to ascertain the percentage of active ingredients and next to standardize. In the absence of standardization the best method would be to ascertain the amount of solids, active and inactive, dissolved. In view of its delicate chemical composition, it is manifest that prolonged heat should not be used to obtain such results, so in all the experiments herein recorded, evaporation of the finished product was not resorted to. The amount of solids dissolved in each fluidounce was found by taking the specific gravity of the infusion (in a flask holding 32·4 gm. of distilled water, at 70° F.), multiplying it by the weight of a fluidounce of water and subtracting from the result 455·69 grains.

The first series of experiments made were to determine whether cold or boiling water exerted the greater solvent action upon digitalis and whether, in each instance, maceration for one, two, three or four hours produced any variation. The results of eight experiments upon the same sample of powdered digitalis (No. 80), one drachm to each pint of infusion, were these, that the cold water infusions were lighter in color than those made with boiling water, and that the specific gravity (1·00154) was identical in *all* cases, whether maceration was for one, two, three or four hours. It may then be deduced that cold water infusions are preferable to those made with boiling water, because, although having the same specific gravity as the latter, they contain a relatively larger percentage of active solids, because the latter hold more coloring matter in solution, and as both exhibit the same amount of dissolved solids it must then contain a smaller quantity of the colorless, active ingredients. This belief is confirmed in the observations of M. Roger[1], who found that "the toxicity of digitalis diminishes very notably, when the product of maceration is concentrated by the water-bath. Then, a 5 per cent. maceration, which is toxic in doses of 0·05 gm., no longer kills save in doses of 1·8 gm., when it is concentrated by 4 per cent. If reduced by 6·6 per cent., 3 gm. would be required to produce the same effect." These experiments would then indicate that the use of heat and boiling water, in the preparation of the infusion, should be avoided, for the reasons that the constituents of the leaf are altered in chemical composition; the active ingredients being changed to non-toxic, inactive ones, whilst the non-active coloring matter is rendered more soluble.

In the previous experiments, the specific gravity of the finished product (made from one drachm of No. 80 digitalis powder to the pint) was 1·00154; showing 0·7 grains of dissolved solids in each fluidounce of the infusion. Eight more samples were now made, double this strength, with cold water and with boiling water, each, and macerated for one, two, three and four hours; using the same digitalis as previously. The results were all alike (sp. gr. 1·00308), indicating 1·4 gm. of dissolved solids in each fluidounce.

It became of interest in this connection, to see just how far this regularity of increase of dissolved solids would go, and fourteen infusions of the same sample of powdered (No. 80) digitalis as previously used, were made of different strengths. The results are these:

Grains to pint,	60,	120,	130,	140,	160,	180,	200,	240,	300,	360,	420,	480,	720,	960.
Solids in fl. oz.,	·7,	1·4,	1·54,	1·68,	1·89,	2 1,	2·38,	2·52,	2·95,	3·51,	4·07,	4·50,	6.35,	8·15.

The regularity of increase seems to be reached with 200 grains to the pint; above that point the increase is variable.

Infusions of the *whole* leaf were now made, taking ten different samples (120 grains to the pint, cold water, two hours' maceration, etc.). With singular unanimity they *all* showed the same specific gravity 1·00308, indicating 1·4 gm. of solids to the fluidounce, a remarkable constancy in the amount of solids dissolved.

---

[1] Toxic Power of Digitalis; *Nouv. Rem.*, Feb. 24, 1889; *vide* AMER. JOUR. PHAR. 1889, p. 174.

To compare this result with those of infusions made from the No. 80 powder (same strength, conditions, etc.) ten different specimens were made from commercial samples. The results are variable, as follows:

Solids in fl. oz., 1·4, 1·26, 1·12, 0·98, 1·4, 1·4, 1·4, 1·12, 1·12, 1·26 grains.

It should be mentioned that in all these experiments the so-called English leaves were used. Right here, it is of value to know whether the popular prejudice in favor of the English leaf is founded on any other basis than that of custom. So ten infusions of German digitalis leaves, as found in commerce (120 grains to the pint, cold water, two hours' maceration, etc.) were prepared. The results were as follows:

Solids in fl. oz., 1·4, 1·12, 1·105, 1·4, 1·105, 1·12, 1·4, 1·26, 1·4, 1·4 grains.

It will be observed that the amount of solids dissolved is not constant, as in the commercial English leaf. Examination of the commercial German leaves reveals the fact that they have not been as carefully selected and freed from stalks, etc., as the English leaves. That the difference in the care of collection and selection is the only difference is shown by the fact, that the infusion when made of leaves selected from each of the ten specimens above evinced 1·4 grains of dissolved solids in each fluidounce, as in the English-leaf infusions, and that the infusion when made of stalks, etc., selected from each of the ten specimens above gave but 0·98 grs. of dissolved solids in each fluidounce, indicating that it was the large and varying quantity of stalks in the commercial German leaves which caused the variability in the amount of solids dissolved, and that the English leaves were superior to the German only because the commercial samples of the former were carefully selected and freed from the stalks; thereby reducing the element of variability to a minimum. In point of fact, it has been intimated that some of the English dealers buy their digitalis leaves in the German markets, and select and repack them as English leaves. Whether this is the case or not the writer does not know.

That the small quantity of solids dissolved in the infusion made of stalks shows a low percentage of active ingredients, is indicated by the experiments of Mr. Broeker,[1] who, while he found about 1 per cent. of digitalin in the parenchyma of the leaf (the stalks and nerves being rejected), found in the stalks and nerves only 0·2 per cent. of that constituent. Moreover, he observed that the presence of these latter is liable to render the infusion gelatinous.

---

[1] *Amer. Drugg.*, Jan., 1888, p. 10; from *Niew Tijdschr. voor de Pharm. in Netherland.*

Although digitalin is insoluble in water, and hence the results of Mr. Broeker cannot be used to prove that the stalks are largely destitute of the water-soluble active principles of digitalis, they would indicate that if there was such a radical diminution in the percentage of one active principle, there was in all.

In the officinal infusion of digitalis, it will be remembered that powdered cinnamon (No. 20) is directed to be infused in connection with powdered digitalis (No. 20). Cinnamon is here employed, not for any medicinal action it may possess, but solely for the purpose of flavoring; a purpose which it but imperfectly fulfills, through the solution of a small quantity of volatile oil of cinnamon.

It is of interest to know whether the presence of this volatile oil exerts any retarding influence upon the solution of the water-soluble principles of digitalis. To determine this point, infusions were made of digitalis leaves, which had shown 1·4 grains of soluble solids in each fluidounce of infusion, and cinnamon water, the specific gravity of which was first taken. The result in all cases indicated but 0·98 grains of solids to the fluidounce, a decrease of 0·42 grains, or 30 per cent. It may be claimed that the officinal infusion of digitalis is by no means analogous to cinnamon water in the amount of volatile oil which it contains. But it seems evident that the presence of that volatile oil, however small it may be in amount, must exert a retarding influence upon the solution of the digitalis principles, and hence powdered cinnamon should be dropped from the officinal formula.

In reducing the strength of infusion of digitalis to 7 grains to each fluidounce, the Revision Committee, in the opinion of many, altered the quantity in the wrong direction. It should have been increased, if anything. But as the limit of regular saturation appears to be about 200 grains to the pint, it would be better to return to the pharmacopœial strength of 1870, *i. e.*, about 7·5 grains to the fluidounce, or 120 grains to the pint.

The following is the formula in use by the writer:

Take of digitalis leaves, bruised..............................	120 grains,
water..	14½ fluidounces,
alcohol..	1½ " "

Macerate the digitalis leaves, previously bruised in a wedgwood mortar, for one hour, with the water; agitating occasionally. Express, filter and wash the residue placed on the filter with sufficient water to make the filtrate measure 14½ fluid ounces. To this add the alcohol. As made by this formula the infusion is a clear transparent, amber-colored liquid, darkening in color on keeping for several days; characteristic in odor and bitter in taste. It is well, in view of the ready decomposition of such a weakly alcoholic solution, to make only such quantities as will last but a short time, or better still, to make it extemporaneously. This latter method is readily practicable with such a short period of maceration. In the preparation of infusion of digitalis there is urged the usage of the English leaf, or the German leaf selected and freed from stalks; the employment of the whole leaf, broken up as above directed, instead of a No. 20 powder; cold water maceration instead of boiling water infusion, for reasons previously mentioned; the omission of powdered cinnamon, as retarding the solution of the digitalis principles and as of no special value as a flavor; and, lastly, one hour's maceration as all sufficient for the solution of the water-soluble digitalis principles.

USEFUL PLANTS OF THE GENUS PSORALEA.

By John M. Maisch.

Read before the Pennsylvania Pharmaceutical Association, June 5.

One of the most interesting groups of plants are those belonging to the order of leguminosæ which—as remarked by Lindley—"is not only among the most extensive that are known, but also one of the most important to man, whether we consider the beauty of the numerous species, which are among the gayest-colored and most graceful plants of every region; or their applicability to a thousand useful purposes." Many of the plants are medicinal or yield medicinal products, quite a number of which have been admitted into the various pharmacopœias, including some which are decidedly toxic, like physostigma.

Among the leguminous plants indigenous to the United States a species of Psoralea, common in our Southern States and west of the Alleghenies, has attracted some attention as a medicine, and though it does not seem to possess properties superior to other more generally known drugs, it will perhaps be of interest to collect together the most important facts, recently ascertained or heretofore known, regarding the medicinal or economic value of the different species of this genus.

The name of the genus is derived from the Greek *psoraleos*, which means "affected with the itch or with leprosy," and has reference to the usually blackish glandular points found on the calyx and often on other herbaceous portions of most of the species. The plants are botanically closely related to the genus *Amorpha*, of which the indigenous *A. fruticosa* has a bark rich in tannin and containing a brown-red coloring matter, dyeing yellow with alum. The genera Glycyrrhiza, Astragalus, Indigofera, Robinia, Wistaria and others belong to the same tribe. The genus Psoralea comprises herbs, also shrubs, having leaves mostly divided into three or five leaflets, and a spiked or racemed inflorescence, the flowers being mostly purplish or blueish; the fruit is a one-seeded, indehiscent, frequently rough or wrinkled legume, which is about the length of the persistent calyx. About one hundred species of Psoralea have been described, of which more than forty, or nearly one-half, belong to Southern Africa, five or six to South America, and about thirty to North America; the greater portion of the latter are confined to the Southern States and west of the Alleghanies, and eight are found in California.

Only a small number of the species have been used, some medicinally, others as food. The food plants as far as known, have their homes in the western section of North America. Two were mentioned some years ago by Dr. Edward Palmer in a paper entitled "Plants Used by the Indians" (see AMERICAN JOURNAL OF PHARMACY, 1878, p. 545), namely:

Ps. castorea, Watson, growing from Arizona to Nevada; the large white farinaceous roots are eaten by the Pah-Utes, raw as well as cooked, or made into bread or mush. The same tribe uses also the roots of

Ps. mephitica, Watson, which are small but farinaceous. The plant is abundant in low places in Southern Utah; its specific name refers to the unpleasant odor of the leaves.

Ps. esculenta, Pursh, has been more widely known than the preceding two species. In the beginning of the present century it was brought to Europe by Lamare-Picquot who recommended it as a substitute for the potato. It was cultivated for some time in France where it became known as *picquotiane;* but the results were not encouraging, and at present it is rarely met with in Europe.

I am indebted to Mr. Clifford Richardson of Washington, D. C., for the following graphic description of the plant, its tuberous root and the uses of the latter, written by Dr. V. Havard, Surgeon U. S. Army at Fort A. Lincoln, Dakota.

"The plant is the *pomme de prairie* or *pomme blanche* of the early Canadian voyageurs; the *prairie turnip* or *prairie potato* of the American settlers; the *tipsinah* of the Sioux, and the *taahgu* of the Osage Indians.

"Description: Perennial; roughish hairy all over; stem stout, erect, somewhat branched, from 5 to 15 inches high, growing from a tuberous root; leaves on long petioles, palmately 5-foliolate, the obtuse leaflets obovate, oblanceolate or oblong, about 1¼ inches long; stipules free, lanceolate; flowers appearing in June and July in dense thick spikes about 2 inches long, borne on peduncles 2 to 3 inches long, exceeding the petioles; each three-flowered cluster subtended by a large bract; lobes of calyx lanceolate, acuminate, 4 to 6 lines long, equal to, or larger than, the gibbous tube, and but little shorter than the purplish corolla; seed oval, 3 lines long, flat, smooth and shining.

"Soon after blossoming the plant dries up into a brown rigid mass, then breaks off and becomes a "tumble-weed" blown over the prairie, scattering its seeds as it goes.

"The tuber is two or three inches under ground. It is irregularly elliptical in shape, from ovoid to fusiform; in size ranging from a hen's egg to a large filbert, averaging 1½ to 2 inches in length and one inch in diameter. The upper end shows the scars of previous years' stems; the lower end is produced into a long and very tough tap root. It is covered with a thick leathery skin, easily peeled off its white and smooth surface. Passing through the axial line are clusters of fibers, which proceed from the stem and run into the tap root. These tough, fibrous clusters are the only inedible part of the skinned tubers. On section it is seen to be composed of a white granular mass, at first somewhat spongy, but becoming hard on drying, in which state it is friable and easily pulverized into a light starchy flour.

"The prairie turnip is a widely distributed plant. It is found from the lakes westward to the Rocky Mountains, and from the Saskatchawan River downward to Louisiana and Texas. It is on the dry table-lands of the Missouri, however, from Montana, through Dakota and Nebraska, to Kansas, that it is most abundant.

"The tuber of this plant has always been of great importance to the Indians, one of their vegetable staple foods. It is mentioned by all the explorers and voyageurs who first traded with the Indians of the Western prairies. It is in its best condition when the flowers begin to fade, in the latter part of July. At that time the squaws start out to gather their crop of tipsinah; formerly they used a strong pointed stick to pry the tuber out; now they use a small iron bar, one end of which is beaten into a narrow blade. The tuber, cut into slices and dried, can be kept for several years without deterioration. In this state it is found in the tents of the Sioux Indians, and formerly constituted an important ingredient of their winter food. Eaten raw it has a very palatable farinaceous flavor. The Indian children, when cutting teeth, are given pieces of it to chew, with apparent benefit; they are treated in the same manner, and likewise with good result, when suffering from bowel complaints. I am told by an old settler that on several occasions, when making long marches without water, he successfully appeased the sharp pangs of thirst by keeping pieces of it in his mouth, their effect, doubtless, being to stimulate the salivary glands. The Indians generally eat this root cooked, and as they appreciate the advantages of a mixed *pot-au-feu*, boil it with tripe, fattened pup, or other choice nitrogenous food.

"Although the prairie turnip is mostly found on high prairies, it does not follow that it prefers a sandy, barren soil; on the contrary, I have observed that it thrives best in deep and fertile soil, if, at the same time, dry and porous; under such conditions the root attains its maximum development. I have hardly any doubt that under patient cultivation for a few seasons it could be improved, perhaps to an extent that would make such cultivation profitable, and supply our market with another toothsome, wholesome and nutritious vegetable."

Dr. Havard had sent some of the root to Mr. Clifford Richardson for analysis, which was completed last year, but has never been published, and was kindly furnished by him for publication with this paper. Mr. Richardson's results are as follows:

Water	9·49
Ash	1·74
Oil (with petroleum ether)	·37
Resinous substances (with ether)	·35
Sugar (with 80 per cent. alcohol)	4·77
Sweet substance (soluble in water)	1·14
Starch (by difference)	69·60
Globulin	1·04
Albumin soluble in water	1 02
Albumin insoluble in water	6·10
Non-albuminoid nitrogenous matter	·90
Fibre	3·48
	100·00

Mr. Richardson remarks that the roots are distinguished by their large amount of starch, the presence of a new sugar readily crystallizing, and by the varied forms of nitrogenous matter; he will further investigate the sugar isolated by him.

An analysis of the root, communicated by Payen to *Comptes rendus* in 1848, gave water 12·50, mineral matter 1·61, nitrogenous matter 4·09, and starch 81·80. The last-named item evidently includes other carbohydrates and compounds separated by Mr. Richardson.

The three American species named above are the only ones used as food, as far as I was able to ascertain. Of the species medicinally employed,

Psoralea glandulosa, Linné, attained some notoriety and created some confusion during the first half of the present century through an error into which the distinguished French naturalist, Alcide Dessalines d' Orbigny was led, more than sixty years ago, while traveling in South America, by referring to this plant the Paraguay tea, or *yerva maté,* which is extensively employed in South America. The parent plant of this tea had been previously named *Cassine Gongonha* by the German scientist, Karl Friedrich von Martius, and *Ilex paraguariensis* by the French botanist, Auguste de Saint-Hilaire. The name given by the last-named authority is generally recognized; but d' Orbigny's error figured in scientific literature to some extent for about thirty years, and as late as 1850, Lenoble, when publishing an analysis of Paraguay tea, followed the erroneous nomenclature [see AMER. JOUR. PHAR., xxiii., 182]. To the same mistake must also be attributed the origin of the statement current in some recent works, that the leaves of this species are used in Chili as a *substitute* for Paraguay tea. The leaves were exhibited at the Centennial Exposition in Philadelphia [see *Proc. Am. Phar. Assoc.*, 1876, p. 765), under the vernacular name of *culen.* The odor can hardly be called agreeable; it resembles that of rue, and the leaves are in their native country employed as a tonic and anthelmintic, and externally as a vulnerary. The root possesses emetic properties. Both the leaves and root have been admitted into the Mexican pharmacopœia under the name of *yolochiahitl* [AM. JOUR. PHAR., 1886, p. 171]. An analysis of either part does not appear to have been made.

Psoralea bituminosa, Linné, is a suffruticose plant of Southern Europe, the leaves being trifoliolate, like those of the preceding species;

the specific name refers to the peculiar odor of the plant. The leaves have long been popularly employed as a tonic, stimulant and emmenagogue.

Ps. physodes, Douglas, likewise a species with three leaflets, is enumerated by Dr. W. P. Gibbons in a "list of the Medicinal Plants of California" (see *Proceedings of Am. Phar. Assoc.*, 1871, p. 300), but its reputed properties or uses are not given. Neither is the plant mentioned by Carter.[1]

Ps. melilotoides, Michaux, s. Ps. Melilotus, *Persoon,* grows from Virginia southward, and westward to Illinois. It is very common in middle and upper Carolina and in Georgia. Two students of the Philadelphia College of Pharmacy, Aug. Bradley and Edward D. MacNair, both from North Carolina, call attention to this plant in their graduating essays, which are mainly of a descriptive nature. As indicated by the specific names the plant resembles the melilot or sweet clover in appearance. It is somewhat pubescent and more or less glandular; the stem grows to the height of two feet, is much branched, and bears trifoliolate leaves, the leaflets varying in shape between lanceolate and narrowly oblong; not unfrequently they are glandless, which is the main distinctive character of the form Psoralea eglandulosa, *Elliott.* The numerous small purplish flowers are in axillary and terminal long-peduncled oblong spikes, and produce oval or suborbicular, transversely wrinkled pods. The perennial root is fusiform, sending out stout branches of similar shape, ½ to 1 inch thick, from 8 to 12 inches and more in length, externally light-brown, internally white, and tough and fibrous in the bark as well as in the meditullium. The plant is collected when in full bloom. The herbaceous portion being of a weaker odor and taste is used to some extent; but the root is the principal part employed. In the fresh state it has an agreeable aromatic odor, and a bitterish spicy, or even rather acrid taste; but odor and taste are much weaker after drying.

Mr. MacNair obtained from the fresh root about 2 per cent. of volatile oil, having the sp. gr. 0·93, a pungent and bitterish taste and a neutral reaction. Tannin appears to be absent; but a dark-green color is produced in the infusion and tincture by ferric chloride. Starch is present; also a bitter principle which has not been isolated.

Dr. Carter (*loc. cit.*) states that the drug is aromatic, bitter tonic, nervine, and is used in chronic strumous diarrhœa. The same properties were attributed to it by Dr. Mettauer, in 1867. It is said to have been much and very advantageously employed by the negroes in an affection of the digestive organs, known to them by the name of *poison*, and is usually given in the form of infusion made with the addition of a little chamomile and Canadian hemp (apocynum). Mr. MacNair has made a number of galenical preparations, among them

---

[1] Synopsis of the Medicinal Botany of the United States. By J. M. G. Carter, M. D., 1888.

Tinctura Psoraleœ composita, following the pharmacopœial formula for compound tincture of gentian, substituting psoralea root for the gentian.

Extractum Psoraleœ was prepared with diluted alcohol and *Extr. Psoraleœ fluidum* with diluted alcohol, the finished preparation containing 5 per cent. of glycerin.

Mr. Bradley states that the drug is administered in the form of a 20 per cent. *tincture*, made with diluted alcohol, and given in doses of one to four drachms.

Some of the popular names of the drug are Samson's snake root, congo root, pigtail root, and Bob's root.

Psoralea pentaphylla, Linné, is a Mexican species having five leaflets. During the past century the root was sent to Spain; it is mentioned in the universal pharmacopœias of Jourdan (1828), and Geiger (1835), as *radix contrayervœ novœ, p. albœ* (*s. majoris, s. mexicanœ*); it had been recommended as a substitute for the South American contrayerva (*Dorstenia*), but like the latter had become obsolete. Though of Mexican origin, it appears to be at present little known in that country, and is not mentioned in the Mexican Pharmacopœias of 1874 and 1884. The root was described as being of the thickness of a finger to about two inches, with a rugose brown bark, which is internally white and covers a white woody axis; taste aromatic and sweet.

Recently the drug was chemically examined by Mariano Lozano y Castro,[1] who obtained the following results: Moisture, 10·0; ash, 3·75; extracted by petroleum ether (fat, 1·38; resin and volatile oil, 0·12), 1·50; ether extract (crystalline acid, 0·40, fat, 0·50, resin and color, 2·40), 3·30; alcohol extract (alkaloid and glucose, 9·25; resin, 1·46), 10·71; water extract, gum and sugar, 8·336; starch, 26·5; albuminoids, 1·0; cellulose and lignin, 28·75 per cent. The presence of an alkaloid was inferred from the precipitates obtained in the aqueous solution of the alcohol extract by tannin, picric acid and platinic chloride. Subsequently Mr. Lozano prepared 8 per cent. (40 gm. from 500 gm. of the root) of what he considered nearly pure hydrochlorate of the alkaloid which gave alkaloidal reactions with other reagents (Mayer's and Marmé's), besides those mentioned before. It was obtained by mixing the powdered root with lime and water, after three days treating with water acidulated with HCl, concentrating the filtrate, mixing with alcohol, filtering, evaporating, treating the extract with alcohol, evaporating, taking up with water, repeating these operations several times, and finally decolorizing with animal charcoal. While it is possible, though by no means certain yet, that the root may contain an alkaloid, it has not yet been isolated, and the chemical reactions and physiological experiments described by Lozano were made with calcium chloride mixed with organic matter of unknown quantity and quality.

---

[1] La contrayerba blanca o de México. Mexico, 1889. Pp. 48.

Psoralea corylifolia, Roxburgh, is an annual plant with undivided leaves, the seeds of which have been long in use in India as a tonic and deobstruent and in skin diseases. In 1876 (*Proc. Am. Ph. A.*, 1877, 209), Dymock called attention to the use made in India with the oil expressed from the seeds, and later (*Ibid.* 1882, p. 245), the oleoresin of the seeds diluted with simple unguents was highly lauded for its efficiency in leucoderma. Sometimes it was used mixed with chalmugra oil, to which some of the alleged effects in skin diseases may have been due. But the writer has been unable to find any record of the results of experiments, which were said to have been undertaken in England with the oil and the oleoresin of these seeds, during the years 1881 and 1882.

Whether others of the North American species of Psoralea, besides those mentioned above, possess valuable medicinal properties must be left for future investigations to decide. The genus is certainly an interesting one, notwithstanding the economic and medical uses are confined to a small number of species and to limited localities.

Chloral in night sweats.—Dr. Nicolai has used an embrocation of chloral hydrate, two drachms, dissolved in a tumblerful of brandy and water. At night about bedtime the patient is rubbed all over with a sponge dipped in this solution. Sometimes three or four rubbings suffice to effect the complete disappearance of night sweats which have previously lasted for weeks. —*Boston Med. and Surg. Jour.*

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph. G.

Salicylic acid can be examined for homologous acids (cresotic acid, etc.) by taking advantage of the low melting point of such a mixture. Three gm. of the acid are heated in a small flask with 15 cc. water and 1–2 gm. pure calcium carbonate (free from iron); after effervescence ceases the solution, without filtration, is evaporated to 5 cc., allowed to cool, diluted with a little water and the solution poured off from the precipitate into a wide test-tube, in which evaporation is continued until 1 cc. remains; by stirring with a glass rod crystallization is hastened; after diluting with 1 cc. water the solution is passed through absorbent cotton, and after concentrating again to 1 cc. in a test-tube the acids are precipitated by addition of HCl. If the original salicylic acid contained 3–5 per cent. of other acids the precipitate obtained above will *melt* under hot water and form a *thick oily liquid* at the bottom of the test-tube.—B. Fischer, *Pharm. Ztg.*, 1889, 329.

Estimation of sodium carbonate in presence of sodium hydrate.—The process depends upon the combined use of phenolphthalein and Blue C. L. B. Poirrier as indicators. The estimation is effected by titrating in the cold 10 cc. of a solution containing 8–10 gm. of the substance dissolved in one liter, after one drop of phenolphthalein has been added with a standardized dilute hydrochloric acid (about 3 cc. acid, sp. gr. 1·16 in one liter water) until a colorless solution results; then adding one drop of Blue, Poirrier, (1 part in 400 parts water) and continuing the titration until the solution becomes dark blue (color of ammoniated copper solution). The acid added after the blue indicator, represents one-half of the carbonate which is present; the total acid added minus that required by the carbonate will give the acid required by the hydrate present. It is stated that the volume of the finished titration should not exceed 50 cc.—Dr. H. Goebel, *Chemiker Ztg.*, 1889, 696.

Mercuric benzoate is made by E. Lieventhal by dissolving 125 parts mercuric oxide in 250 parts nitric acid, sp. gr. 1·20, diluting with 4000 parts distilled water and filtering; 188 parts sodium benzoate are dissolved in 4000 parts distilled water, the solution filtered and slowly added, with constant stirring, to the first solution; the bulky precipitate is collected on a linen strainer, thoroughly washed with cold water, expressed and dried. The product forms a light, white powder, slightly soluble in ether, alcohol, chloroform and water, but easily dissolves in water if half its weight of sodium chloride is added. This solution gives all of the reactions of mercuric salts, excepting the precipitation by albumen; to this behavior its use in subcutaneous injections is possibly due. Alcohol and ether poured over the powder cause it to assume a yellow color.—*Pharm. Ztschr. f. Russl.*, 1889, 310.

Potassium chlorate, identification of in legal cases. 1. A few crystals in a test tube treated with one to two drops concentrated HCl produce a yellowish-green coloration and the suffocating odor of chlorine; on adding a few drops of the turbid, brownish mixture obtained by mixing a dilute gold solution with a dilute oxalic acid solution and warming, chlorate is indicated by the finely divided gold immediately dissolving with formation of a yellowish solution; nitrates will not dissolve the precipitated gold. 2. One drop concentrated H_2SO_4, to which a minute fragment of the salt has been added, on stirring with a glass rod assumes an orange-red color, which, on addition of one drop benzole becomes green, afterwards sky-blue; with nitrates only a faint yellowish coloration is produced. 3. Sulphuric acid and the salt, as before, with a trace of aniline or one of its salts, forming a beautiful blue-violet coloration, intensified by addition of a little water, also proves the presence of chlorate.—*Vitalli* (*L'Orosi*) *Pharm. Centralh.*, 1889, 328.

Hydracetin is the name proposed by Guttmann for *pure acetphenylhydrazid*, $C_6H_5NHNH(C_2H_3O)$, which a year ago was used in England in an impure condition under the name of pyrodine. It forms a white, crystalline, odorless and almost tasteless powder, difficultly soluble in water (1 : 50), easily soluble in alcohol and possesses even in small doses decided antipyretic action. The dose should not exceed 0·1 per day, best given in two doses of 0·05 gm. each. Hydracetin is a powerful reducing agent, especially on warming and in presence of alkalies; cupric solutions deposit cuprous oxide; silver and platinum solutions deposit metallic silver and platinum; mercuric solutions and ferric salts are reduced to mercurous and ferrous salts; potassium permanganate is decolorized. A fine carmine-red color is obtained by dissolving hydracetin in a mixture of concentrated H_2SO_4, ninety-eight parts, and HNO_3, two parts. The medicinal effects of this remedy are thought to be caused by its strong reducing action; it has also been successfully used as ten per cent. ointment in the treatment of Psoriasis.—*Pharm. Centralhalle,* 1889, 311 and 341.

Starch determinations.—Asboth's method of precipitating gelatinized starch by barium hydrate in presence of alcohol has been repeatedly criticized as to its value in the examinations of cereals, inasmuch as Lintner's method of converting the starch into glucose by action of diastase and dilute acid always gave results which were 6–8 per cent. lower. Asboth, *Chemiker Ztg.*, 1889, 591 and 611, has studied the causes of the differences and finds them due to the presence of fats or oils which, by containing free acids or easily decomposable glycerides, combine with the barium hydrate and thus increase the results for starch. This source of error is now removed by extracting the substance first with ether to remove fats, exposing the extracted substance to the air to remove the ether and determining in one portion the moisture, in another portion the starch as follows: About 1·5 gm. are gelatinized in a flask with 100 cc. water, after cooling to the ordinary temperature, 50 cc. barium hydrate solution added, thoroughly mixed by agitation, and then diluted with alcohol of 45 per cent. to make 250 cc. After the precipitate has completely subsided 50 cc. of the clear liquid representing 10 cc. $Ba(OH)_2$ are removed with a pipette and in this the $Ba(OH)_2$ determined by titration with $\frac{1}{10}$ *n* hydrochloric acid, using phenolphthalein as the indicator. 10 cc. of $Ba(OH)_2$ solution must also be titrated and, the difference, in cc. $\frac{1}{10}$ *n* HCl, between the two titrations multiplied by 0.162 will give the amount of starch in the weight taken; this figure must be re-calculated for the original fat-containing cereal.

An insecticide of especial value against the Phylloxera is made by saponifying any vegetable oil with sulphuric acid, incorporating carbon disulphide and exactly neutralizing with an alkali; this preparation is as efficacious as pure carbon disulphide, but is not volatile and is miscible with water. In contact with water or moist soil, slow decomposition takes place with evolution of SO_2 and mercaptans, which latter increase the effectiveness.—Kühl, *Apotheker Ztg.*, 1889, 506.

Mandragorine is the name of the alkaloid which was found in the roots of Mandrogora autumnalis and M. vernalis by extracting with alcohol, recovering the alcohol by distillation, taking up the residue with water acidulated with sulphuric acid, rendering the solution alkaline with potassium carbonate, agitating with ether and evaporating this solution. The alkaloid melts at 77–79°, and has the formula $C_{17}H_{23}NO_3$; the sulphate forms lustrous, deliquescent scales, the solution of which introduced into the eye dilates the pupil. Although isomeric with atropine, hyoscyamine and hyoscine, the double chlorides with the following metals possess different melting points: with Au, 153–155°; with Pt, 194–196°; with Hg, 160–161°; the crystalline forms of these double salts are not identical with those of the three alkaloids mentioned. The conversion of mandragorine into atropine by the action of sodium hydrate could not be effected. A second alkaloid in very minute quantity was extracted by treating the residue of the above alcohol extraction with water acidulated with HCl, concentrating, adding K_2CO_3 in excess and agitating with ether; the residue after evaporating the ether was also mydriatic and formed double chlorides with Au, melting point, 147–153°; with Pt, melting point, 179–181°.—F. B. Ahrens (Liebig's Ann.), *Pharm. Ztg.*, 1889, 308.

Lithium salts.—Sulphate of lithium is generally quoted as being soluble in alcohol. F. Kobbe found that one part sulphate, $Li_2SO_4+H_2O$, is soluble in 8000 parts of alcohol specific gravity 0·812, in 125 parts of alcohol specific gravity 0·885, and in 79 parts of specific gravity 0·902; the presence of sulphuric acid increases the solubility, one part sulphate with an equal weight of concentrated sulphuric acid dissolving in 43 parts of alcohol specific gravity 0·885. *Acid lithium sulphate* cannot be prepared; a mixture of normal sulphate with H_2SO_4, after moderate heating, had a composition approaching that for $LiHSO_4$, but the addition of alcohol decomposed it into Li_2SO_4 and H_2SO_4. The solubility of the sulphate can be used as a test of purity for *carbonate of lithium:* 0·5 gm. carbonate of lithium dissolved in 10 gm. dilute sulphuric acid must remain clear on addition of 20 cc. alcohol. From 3 to 4 per cent. potassium carbonate and as little as 0·5 per cent. calcium carbonate can be detected by this test; sodium carbonate in quantities to 10 per cent. cannot be detected, but here recourse is had to the flame test, 5 per cent. Na_2CO_3 entirely obscuring the lithium flame. This test is more delicate than the one based on the solubility of the chloride in alcohol.—*Pharm. Ztg.*, 1889, 312.

Commercial Oleic Acid is largely adulterated with *linoleic acid*; the presence of one per cent. can be detected by saponifying 50 gm. of the sample with alcoholic potassium hydrate solution, evaporating the alcohol, dissolving the soap in one liter water and thoroughly mixing the soap solution, which must be strongly alkaline, with one liter of a 5 per cent. potassium permanganate solution; after standing ½-1 hour the mixture is filtered, the filtrate acidulated with dilute H_2SO_4, and again filtered from the precipitate; this filtrate is neutralized with potassium hydrate, concentrated to about 300 cc., acidulated with sulphuric acid and, at once, agitated with ether; if the precipitate is soluble in ether only azaleinic acid $C_9H_{16}O_4$ is present, formed by the oxidation of oleic acid, and the oleic acid was free from linoleic acid; if the precipitate is insoluble in ether it is removed by filtration, purified by recrystallization from alcohol or water in presence of animal charcoal and the melting point of the dried crystals determined, should this be above 160° linoleic acid was certainly present. As a control experiment the combining value of the crystals can be determined, which should approach 150.—K. Hazura, *Chem. Report,* 1889, 168.

Chemical examination of resins, gum-resins and balsams.—The suggestion made by Kremel to examine the above classes of substances by Hübl's method of examining waxes (see AM. JOUR. PHARM., 1888, 561), was carried out by Dieterich with results which indicate the value of the method in examining the balsams. The figures given represent the extremes:

Resins and Gum-resins.	Acidity–	Ester–	Saponification figures.
Ammoniac, purified......	132	73	205
Colophony....................	157-169·6	———	———
Benzoin, Siam..............	140	35	175
" Sumatra..........	112	51·4	163·4
Balsams.			
Canada........................	84 86·8	———	———
Copaiba, Para................	52·3 53·2	———	———
" Maracaibo......	73·7-86·8	———	———
" East India.......	6·5-7·4	10·3-11·2	16·8·18·6
Mecca, crude................	42·7 43·8	———	———
" purified............	40.1	———	———
Peru............................	50·4-58·8	196-201·6	246·4-254·8
Tolu, crude...................	121·126	49 60·6	173·1-181·6
" purified..............	154 158	14-32·6	172·6-186·6
Styrax, crude...............	64·4-87	87-162·4	157-249·4
Terebinth. commun.......	108·2	———	———
" venet..........	78·4	———	———

Attention is called to the differences in *acidity* of the varieties of copaiba, also that only the East Indian contains esters; so it is possible to distinguish the varieties and even approximate admixtures. The results of the balsam examinations with the exception of styrax are fairly uniform and encouraging to further work.—(Helf. Ann.) *Pharm. Post,* 1889, 336.

ERYTHROXYLON COCA GROWN IN INDIA.[1]

By C. J. H. Warden.

Several samples of *Erythroxylon Coca* leaves, grown in various districts in India, have been examined by the author; the mode of culture, altitude, and meteorological characters of the district, the kind of soil and manuring, and the methods of curing, being taken into consideration. The alkaloid was estimated by Squibb's modified method:—the dry pulverized leaves were moistened with alcohol acidified with sulphuric acid, percolated with alcohol, the percolate mixed with acidified water, and extracted with ether, then rendered alkaline with sodium carbonate, and again extracted with ether. This extract was washed twice with water, dried and weighed; the amounts of "crude alkaloïd" so determined are given in the following table:—

District where grown.	Moisture.	Per cent. dry leaves.	
		Ash.	Crude alkaloïd.
Ranchi, young leaves	6·18	6·71	1·139
" mature leaves	8·22	8·99	0·883
Arcuttipore, Cachar	6 08	7·39	1·369
" "	6 72	6 36	1·671
Darjeeling	10·37	7·58	1·115
Alipore, Calcutta	10·42	10·23	0 358
Matelli	9·30	12·18	1·022
Chulsa, Dooars	5·71	7·62	0·610
Jaunpore	10·05	12·64	0·571

The crude alkaloïd was very faintly yellow, and in no case showed any tendency to crystallization, although attempts were made to induce crystallization by extracting at various temperatures, and without applying heat, and by employing different acids and solvents. The alkaloïd obtained is, nevertheless, quite similar to cocaïne from other sources in its physiological action, except that it seems to be more active. It dissolves readily in hydrochloric acid, and yields a soluble and insoluble platinochloride, the former containing 18·75, the latter 18·88 per cent. of platinum; discrepancies from the theoretical are assumed to be due to a variable quantity of cocamine (Hesse, Am. Jour. Phar., 1887, p. 455) in the alkaloïd from Indian leaves. Both platinum salts yielded bases producing marked anæsthetic effects on the tongue; Howard has observed that the insoluble platinochloride obtained from other leaves was devoid of this property (Phar. Jour. and Trans., July 23, 1887). In one instance stellate crystals of the base from the soluble platinum salt were obtained. Applying Williams' method, the crude alkaloïd showed 2·89 per cent. of impurity, but the precipitates were not crystalline. It is noted that after the addition of ether to the acidified alcoholic solution, larger deposits of the sulphur-yellow cocatannic acid were obtained from those samples containing the highest percentages of alkaloïds, it is hence suggested that possibly cocaine exists in the leaves as cocatannate.

---

[1] *Chem. News*, lviii., 249–251, 260–262, 273–276; reprinted from *Jour. Chem. Soc.*, March, 1889.

Methods of cultivating the plants are described: the leaves are first gathered 1½ years after transplanting, subsequently, whenever they are sufficiently mature; and, although the method of curing does not appear to affect the quality or quantity of the alkaloïd obtained, nevertheless it is best, taking into consideration Paul's experience, to dry them, soon after gathering, at as low a temperature as possible, and when dry and cold to pack them closely in air-tight chests, as they are very hygroscopic. The quantity of alkaloïd produced increases with the age of the plants (which attain a height of from 2 to 6 feet) up to 10 years, and after 20 years a slight falling off is observed, although they are in their prime even when 35 or 40 years old.

From the above results, obtained from plants and leaves of various ages, it would seem that, in India, neither altitude nor rainfall have much influence on the proportion of alkaloïd in the leaves. The ash, in all cases except one, was white, the exception being an ash of a reddish hue from mature Ranchi leaves. A partial examination of some of the ash showed that they contained the following percentages:—

Samples from	Soluble constituents.	K cal. as KHO.
Darjeeling	44·42	29 26
Alipore, Calcutta	34.60	19·13
Arcuttipore, Cachar	59·02	29·84
Matelli	64·17	31·36

So that both nitrogenous and potash manures will probably be required in the future to keep up the yield from the same plantation.

ANDROMEDOTOXIN.[1]

By P. C. Plugge and H. G. de Zaayer.

Plugge first obtained andromedotoxin, which he extracted from *Andromeda japonica*, *A. polifolia*, *A. Catesbœi* and *A. calyculata* (see Am. Jour. Phar., 1883, 196).

The aqueous extract of *Rhododendron ponticum* leaves was treated successively with normal and basic lead acetate. From the filtrate, the lead was separated by hydrogen sulphide, and the liquid was concentrated by slow evaporation in the air, and treated repeatedly with considerable quantities of chloroform. The residue left on evaporating the chloroform was purified by re-solution in chloroform (or alcohol) and precipitation by the addition of a considerable amount of ether. This treatment several times repeated finally yielded well-formed, crystalline needles which melted at 228–229°. At 12.5°, water dissolves 2 81 per cent.; alcohol (of 94 per cent.) 11·1; amyl alcohol, 1·14; chloroform, 0·26; ether, 0·07; benzene, 0·004. The solutions in water, alcohol, and amyl alcohol are lævorotatory, whilst that in chloroform is dextrorotatory. Andromedotoxin, $C_{31}H_{51}O_{10}$, is an indifferent non-nitrogenous compound; its solution in different liquids has a neutral reaction, and it is not precipitated by any of the so-called general alkaloïd reagents. Its reaction with dilute and concentrated mineral acids is characteristic, as with them it gives intensely red decomposition-products. Concentrated sulphuric acid gives a dark reddish-brown, which becomes deeper red on warming, and turns light mulberry-red on dilution with water. The addition of alkali removes the color, which reappears on acidifying. Evaporation with dilute (1 : 5) sulphuric acid gives a beautiful rose-red color. The pure material gives off no odor during this evaporation, but if not completely purified, a strong and very characteristic odor of ericinol is evolved. Evaporation with dilute hydrochloric acid gives a residue somewhat more violet-red in tint. Evaporation with phosphoric acid gives a mulberry-red residue, clearly perceptible with very minute quantities, as in the case of the other acids. The fatal dose for small animals has been found to vary from 0·1–0·45 mgrm. per kilo. body-weight. No chemical antidote is known as yet. In investigating poisoning cases, Dragendorff's process is recommended; but no acid should be used for extraction, as the solubility of the poison is not thereby increased. After extraction and purification by evaporation, taking up in alcohol, etc., the substance may be agitated with light petroleum, then with chloroform, and to the residue left by the chloroform the characteristic tests given above may be applied.

---

[1] (*Arch. Pharm.* [3], xxvi., 997–998: reprinted from *Jour. Chem. Soc.*, March 1889, p 278).

NOTE BY THE EDITOR.—Professor Plugge has continued his researches on the presence of andromedotoxin in the order of ericaceæ, and has published his results in *Archiv der Pharmacie*, February, 1889, pp. 164–172. The process for isolation was the one given above; to determine the presence of the principle, the physiological behavior and the most characteristic chemical reactions were used.

Andromedotoxin was found to be present in Kalmia latifolia, *Lin.*,[1] Rhododendron maximum, *Lin.* and Rh. Chrysanthum, *Lin.* To these must be added the following ericaceæ, which had been previously found to contain the same poisonous principle: Andromeda japonica, *Thunb.*, A. polifolia, *Lin.*, A. Catesbæi, *Walt.*, A. calyculata, *Lin.*, A. polifolia angustifolia, Rhododendron ponticum, *Lin.*, Rh. hybridum and Azalea indica.

The following plants were ascertained to be free from andromedotoxin: Arctostaphylos officinalis, *Wimm.*, Chimaphila umbellata, *Nutt.*, Oxydendron arboreum, *De Cand.*, Erica vulgaris, *Lin.*, Ledum palustre, *Lin.* To these must also be added the following, which were previously ascertained to be free from this principle: Gaultheria procumbens, *Lin.* (by Prof. Power and N. C. Werbke), Rhododendron hirsutum, *Lin.*, Clethra arborea and alnifolia, *Lin.*

From experiments made by Dr. de Zaayer in determining the lethal dose, for frogs and rabbits, of the fluid extract of Kalmia latifolia, and comparing with the effects of pure andromedotoxin, it is estimated that the former contains about 0·05 per cent. of this poisonous principle.

Fromentin, a new alimentary substance, is the embryo of the wheat reduced to flour, and is stated to contain three times more nitrogenous substance than meat, and a strong proportion of sugar. Hence it would appear that it might advantageously replace powdered meat as a concentrated food. It may be employed for making soups, and even for making biscuits, the taste of which would not be disagreeable.—*Lancet*, March 9, 1889.

---

[1] In quoting the literature, Prof. Plugge states that "G. W. Kennedy has found (AM. JOUR. PHAR., XLV, p. 115) the alkaloid (sic) arbutin." Prof. Plugge has evidently not seen the original paper which was published in AMERICAN JOURNAL OF PHARMACY, XLVII (1875) page 5, and in which the word alkaloid does *not* occur.—EDITOR AM. JOUR. PHAR.

COMPOSITION OF THE RESIN FROM PINUS SILVESTRIS.[1]

By V. Shkateloff.

Owing to the discrepancies in the results obtained with the resin of *Pinus maritima*, *P. Larix*, and *P. Abies*, and the uncertain composition of pimaric, sylvic, pinic, and abietic acids, the author has investigated the crystalline acid from the Russian resin obtained from *Pinus silvestris*, growing in the Archangel and Wologda Governments. In order to remove the uncrystallizable substances, the resin, ground fine, was extracted with alcohol of 50—60 per cent. (Maly, *J. pr. Chem.*, lxxxvi, 111), and the residue, which was much whiter than before, was now treated with boiling spirit; the filtered alcohol solution, after remaining some time, becomes almost entirely converted into a crystalline mass. The crystals were washed with alcohol of 85 per cent. and again recrystallized. After thrice repeating this process, 30 per cent. of a perfectly white product was obtained; whereas on repeating the same process with a resin that had been exposed to the action of air for one year, only 20 per cent. was obtained. In order to prevent this from becoming yellow and oxidizing in the air, the operations have to be carried on as quickly as possible; finally a compound, melting at 143°, was obtained. The acid, $C_{40}H_{58}O_5$, is insoluble in water, but easily soluble in alcohol, ether, acetic acid, and liquid hydrocarbons. After fusion, it solidifies to an amorphous, transparent mass, and when heated above 360°, a colorless, uncrystallizable distillate passes over. The rotatory power of the alcoholic solution was found, $[a]j = -73.59°$. It decomposes alkaline carbonates with liberation of carbonic anhydride, and the original acid is reprecipitated from the solution on adding a mineral acid. By the action of hydrogen chloride on the alcoholic solution, the acid is converted into an isomeric acid of the same composition—but of different properties, as it melts at 159—160°, and the rotatory power is $[a]j = -92{\cdot}58°$. From the sodium salt of the original acid, other salts of the following composition were obtained: $C_{20}H_{29}AgO_3$; $(C_{20}H_{29}O_3)_2Ba+2H_2O$; $(C_{20}H_{29}O_3)_2Ca$, and $(C_{20}H_{29}O_3)_2Cu$. The acid $C_{40}H_{58}O_5$ appears to be a partial anhydride of an acid which gives the above salts, and whose formation may be represented as follows:—$C_{40}H_{58}O_5+H_2O = 2C_{20}H_{30}O_3$. The ethyl salt, $C_{20}H_{29}O_3Et$, was obtained as a heavy oil by acting on the silver salt with ethyl iodide. On distillation, it decomposes with elimination of water and the formation of another ethyl salt, according to the equation $C_{20}H_{29}O_3Et = C_{20}H_{27}O_2Et + H_2O$. This new compound is a heavy yellow oil which yields a resin with potassium hydroxide. Finally the author shows that the resinification of the acid when exposed to the air consists in an oxidation accompanied by loss of water. The acid described above agrees in properties with Maly's abietic acid, but differs from it in composition.

---

[1] *J. Russ. Chem. Soc.*, 1888, xx, 477—485; reprinted from *Jour. Chem. Soc.*, April, p. 406.

ESTIMATION OF PROTEÏDS WITH SPECIAL REFERENCE TO MILK.[1]

By J. Sebelien.

Milk contains three proteïds, caseïn, lactalbumin and traces of lactoglobulin. In order to test the method adopted for the quantitative estimation of the total proteïds and of the individual proteïds, a number of preliminary experiments were made with solutions of (1) pure caseïn containing small quantities of calcium chloride and sodium phosphate, (2) lactalbumin, and (3) egg albumin. Ritthausen's copper sulphate method of precipitating total proteïds was first investigated in the following way: the total nitrogen in the proteïd solution, in the precipitate, and in the liquid from which the precipitate had been filtered off, was estimated by Kjeldahl's process. The two first named had practically the same amount of nitrogen in them, whilst the filtrate was free from nitrogen. Lead acetate was similarly tested; some proteïd was left in solution, and the nitrogen in the precipitate plus that in the filtrate gave too high a result. Tannic acid was found to precipitate all proteïds completely; the precipitate must however, not be washed with hot water or with spirit, as it is partially soluble in both those reagents. Albumoses are only incompletely precipitated by tannic acid, and peptone is soluble in excess of the reagent. The properties of phosphomolybdic acid are much the same, except that it causes a more complete precipitation of both albumoses and peptone.

The question whether albumoses and peptone occur in milk was then investigated. Saturation with ammonium sulphate completely precipitates all proteïds but peptone, which, if present, may be identified in the filtrate by the biuret reaction (Kühne), or better still by the precipitate it gives with tannic acid. Peptone is, however, absent in milk, and also in colostrum, and in whey; the whey-proteïd of Hammarsten is thus not of the nature of peptone. It is, however, present in kephir, and in "long-milk" (a preparation made from milk in Upper Scandinavia). Other portions of milk were precipitated with tannic acid, and the filtrate was found to contain only such small quantities of nitrogen as would be accounted for by the urea, hypoxanthine, and other non-proteïd constituents; albumoses are absent therefore.

---

[1] *Zeit. physiol. Chem.*, xiii., 135–180; reprinted from *Jour. Chem. Soc.*, April, p. 450.

The method of estimating the total nitrogen in the precipitate produced by tannic acid, and multiplying this by 6·37 to obtain the total proteïds, is recommended as the most accurate method in quantitative investigations of proteïds, and is stated to produce less error than the more usual methods involving the washing, drying, weighing and incineration of proteïd precipitates.

In order to estimate the caseïn and lactalbumin separately, rennet and various salts added to saturation have been recommended; these were all tested, and magnesium sulphate was found to be the best; it precipitates all the caseïn and the trace of lactoglobulin which is seemingly disregarded, and leaves all the albumin in solution. Sodium chloride was also found to precipitate all the caseïn. The albumin has been estimated by others, by weighing the precipitate produced by boiling after the separation of the caseïn. But boiling was found to be a very incomplete method of precipitating it; much nitrogen occurring in the filtrate after its removal. It is suggested that boiling lactalbumin and other proteïds split them (as Hammarsten found with fibrinogen) into an insoluble proteïd which is precipitated, and a soluble one which is left in the filtrate. It was found that solutions of pure caseïn when heated do not coagulate, but become opalescent, becoming clear again, however, on cooling. With regard to colostrum, many contradictory statements are quoted as to the relative amount of caseïn and albumin. By the present method it is found that the amount of these two proteïds is very variable; that the quantity of globulin is very considerable, and that the non-proteïd nitrogenous constituents are more abundant than in milk.

The following method was adopted in the analysis: (1.) Total nitrogen first estimated in the colostrum. (2.) Proteïd nitrogen estimated in the tannic acid precipitate. (3) Nitrogen in the precipitate produced by saturation with magnesium sulphate (caseïn + globulin). (4.) Caseïn nitrogen estimated in the precipitate produced by adding acetic acid to milk. (Approximate.) (5.) Globulin nitrogen; two estimations; maximal, obtained by the difference of (3) and (4); minimal, estimated in the precipitate produced by magnesium sulphate after separating the caseïn by saturating with sodium chloride. (6.) Albumin-nitrogen, estimated in the precipitate produced by adding tannic acid to the filtrate after the separation of the proteïds, precipitated by magnesium sulphate saturation. (7.) Non-proteïd nitrogen is the difference between (1) and (2).

The following table gives the results in the analysis of five specimens of colostrum:

	(1.)	(2)	(3.)	(4.)	(5.)	(6.)	(7.)
1........	1·232	1·025	0·887	—	0·100	0.138	0·207
2........	2·506	2·269	2·02	0·56	0·248 1·46	0·25	0·237
3........	2·566	2·461	2·147	0·534	1·604 1·613	0·314	0·086
4........	2·222	2·086	1·903	0·718	0·3 1·185	0·183	0·076
5........	1·10	—	0·716	0·55	0 081 0.166	—	—

PEPSIN IN NORMAL AND PATHOLOGICAL URINE.[1]

By E. Stadelmann.

A proteolytic ferment acting like pepsin in an acid medium has been found by many observers in urine. Neumeister (1888), brought forward a proof that this is pepsin, when he showed that in Carnivora injection of primary albumoses into the circulation caused the appearance of deuteroalbumose in the urine; and deuteroalbumose when injected was similarly converted into true peptone.

In the present research, the question whether the ferment is pepsin or another ferment something like pepsin was investigated by performing experiments with the ferment outside the body on fibrin; and the results may be thus summarized:

(1.) The ferment is true pepsin, as by its action all the products of peptic digestion are formed; protoalbumose, heteroalbumose, deuteroalbumose, and peptone. (2.) If, however, the solution contain but little ferment, the only products of digestion are acid-albumin and small quantities of the primary (proto- and hetero-) albumoses; and, indeed, these products can be obtained by the action of 0·25 per cent. hydrochloric acid without any pepsin or raw fibrin; the same strength of acid has no action on boiled fibrin; but 1 per cent. hydrochloric acid acts energetically by itself on boiled fibrin, forming even deuteroalbumose and peptone.

---

[1] *Zeit. Biol.*, xxv., 208–231. Reprinted from *Jour. Chem. Soc.*, April, p. 430.

The influence of small quantities of various salts on tryptic digestion has been investigated by Nasse (*Pflüger's Archiv.*, xi.), Heidenhain (*ibid.*, x.), and A. Schmidt (*ibid.*, xiii.). This same question is here investigated for peptic digestion. A number of specimens, each containing the same amount of artificial gastric juice and fibrin, were taken, with different amounts of various salts, and the time noted in which solution of the fibrin occurred. A concentration equal to 0·02 per cent. of various urates was found to exert inhibiting influence on the action of pepsin; much smaller percentages (0·004) of sodium sulphate, potassium sulphate, ammonium sulphate, and magnesium sulphate produced the same effect, whilst sodium chloride and sodium phosphate only exerted a similar action when present to the extent of 0·01 per cent.

The urine of various patients was investigated as follows: The urine was divided into three parts: (1) was diluted with 0.25 per cent. hydrochloric acid in the proportion of 1 of urine to 3 of dilute acid; (2) fresh, raw fibrin was added to extract the ferment, the fibrin was then washed and digested in 0·25 per cent. hydrochloric acid; (3) was the control specimen; it was treated as in (1), but was also boiled, fibrin being then added to each. Trypsin was sought for but never found. In fever patients, pepsin seems never absent from the urine; this includes typhoid fever, in which some have failed to find the ferment. Also in severe cases of stomach disease, including cancer, pepsin was often found. No diagnostic value can therefore be attached to the presence or absence of pepsin in the urine in cases of disease.

Iodized glycerin is a mixture of tincture of iodine and glycerin, which considered by Dr. G. Hammond to be more effectual than the tincture, is possibly because the evaporation of the iodine is prevented.—*Jour. Am. Med. Assoc.*, March 9, 1889.

GLYCERITES OF FERROUS SALTS.[1]

By Charles Arthur.

Liquid preparations of ferrous salts, such as the syrup of iodide of iron, have always been a source of difficulty and trouble to pharmacists. This is due to the facility with which such solutions absorb oxygen, and become changed into the ferric condition, and many suggestions of a more or less satisfactory kind have from time to time been made to obviate this objection. The plan now generally adopted, and the one which has been perhaps most successful is the addition of a small percentage of free hypophosphorous acid; even this, however, is not always found to be satisfactory. It is well known that glycerin possesses the property of preventing oxidation of ferrous salts, and even of reducing ferric salts to the ferrous state. Its sweetness also makes it a convenient substitute for sugar. From these properties it occurred to me that it would be a very suitable vehicle for a preparation analogous to the official syrupus ferri iodidi, and at the same time free from the objections to which the latter is liable. Some time ago I first prepared several such preparations, to which, following the example of the U. S. Pharmacopœia, I have applied the name glyceritum or glycerite, and after a considerable experience they have proved satisfactory.

Referring to the literature on the subject, I observe that the idea has occurred to others as well as myself. M. Veza (U. S. Dispensatory, p. 1796) gives a formula for a 20 per cent., and S. Plevani (Year Book, 1885, p. 266), a 23 per cent. solution of ferrous iodide in glycerin.[2] These suggestions do not however seem to have attracted general attention, and I have thought it might be useful if I were to bring before you some of my experience, and one or two working formulæ. The formula for glyceritum ferri iodidi from which I have been accustomed to work is designed to yield a product containing 10 per cent. of ferrous iodide, but adapting the proportions to the standard of the syr. ferri iodidi B. P., the following formula will be found to work well:

---

[1] Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Tuesday, April 9; reprinted from *Phar. Jour. and Trans.*, April 20, p. 341.

[2] The substitution of glycerin for syrup was first recommended by Fr. Stearns (see Am. Jour. Phar., 1857, p. 522); and for a portion of the syrup, by Dr. Henry Thayer, in Amer. Jour. Phar., 1858, p. 390.—Editor.

GLYCERITUM FERRI IODIDI.

Take of iron	1 oz.
" iodine	2 ozs.
" distilled water	3 fl. ozs.
" glycerin	27 fl. ozs., or a sufficiency.

Mix two ounces of the water with an equal volume of glycerin in a flask, and in this mixture digest the iodine and iron, heating slightly, and occasionally shaking until the froth becomes white, then filter the liquid into 16 fluidounces of the glycerin, rinse the flask and iron wire, and wash the filter with the remaining ounce of water. There is no provision in the B. P. for washing the filter, hence there is loss of iodide. Mix and make up the measure of the product when cold to 31 fluidounces. Its specific gravity should be about 1·300. It contains 4 3 grains ferrous iodide in 1 fluid drachm.

The specific gravity of glycerin varies slightly, and where the strength and dose are calculated on the fluid measure it ensures greater accuracy to make up the product to a definite quantity as above, than to a definite weight, as in the case of the official syrup. ferri iodidi.

Another syrup for which there has been some demand, and which has also been a source of annoyance to many pharmacists, is the syrup of bromide of iron. I have had entirely satisfactory results with a glycerite of this containing 5 grains of ferrous bromide in the fluid drachm. It is made by the following formula:

GLYCERITUM FERRI BROMIDI.

Take of iron	385 grains.
" bromine	770 "
" distilled water	3 fl. ozs.
" glycerin	26 fl. ozs.

Proceed in the same way as for glyceritum ferri iodidi. This glycerite contains about 5 grains in the fluid drachm, and has a specific gravity of about 1·300.

The same idea can, of course, by suitable manipulation be applied to liquid preparations of other ferrous salts, such as hypophosphite, phosphate, protochloride and sulphate, and to mixtures containing any of these.

On the same lines, a couple of years or so ago, I prepared a substitute for Blaud's pills by making a glycerite of ferrous sulphate and a syrup of carbonate of potash, 5 grains of each in the drachm, but such a preparation has the disadvantage of being more difficult to manage than pills.

So far as appearance, taste and properties are concerned, these glycerite preparations are all that could be desired. They have recently been used to a considerable extent in hospital and private practice. I am able to state that Dr. Carmichael, of Mansfield Place, Edinburgh, has used the glycerite of iodide of iron pretty extensively of late, and I have further testimony regarding the glycerite from Dr. Jamieson, resident physician, in the University wards under Professor Greenfield, Edinburgh Royal Infirmary. He says the drug is extremely palatable in this form, whereas in the other form it is not, and that all the properties of the drug are retained, and that it agrees extremely well with strumous children.

Dr. Lockhart Gillespie, resident physician in Dr. Claud Muirhead's ward, Royal Infirmary, says that it makes a very nice compound, which to all appearance has good keeping properties, and serves as a good tonic for convalescing patients. Dr. Gillespie states that he hopes to give these preparations an extended trial in diseases of children during the coming summer, when he will be physician to the Sick Childrens' Hospital, Edinburgh.

I would submit one or two points in favor of the ferrous liquids being prepared with glycerin.

Glycerin is not objectionable, but the reverse, in all cases in which ferrous salts are used. Bromides and iodides are said to be useful in diabetes, but, of course, as syrups, could not be given; compounded as glycerites, however, the sugar objection is at once overcome. Some medical authorities are said to be averse to the administration of sugar to strumous patients. Syrup frequently causes acidity. Glycerin prevents it.

In the 1885 formula for the official syrup of iodide of iron, a portion of the sugar is changed into invert sugar by boiling, with the view of retarding oxidation. I would suggest that instead of this a certain proportion of glycerin should be added. I believe this would be quite as effectual and less objectionable than hypophosphorous acid. But I trust I may be excused for suggesting that it might be worth while considering whether the syrup might not be discarded altogether, and the glycerite substituted.

Phenacetin has been found of some value in whooping cough. Dr. Heimann gave as much as fifteen grains of it to children of about four years, without observing any ill effect.—*Münch. Med. Woch.*

NOTES ON ESSENTIAL OILS FROM MESSRS. SCHIMMEL AND CO.'S REPORT.*

(*Continued from page* 314.)

Citronelle Oil.—The exports of this oil from Ceylon during the year 1888 are estimated to have amounted to at least double the exports of the previous year, since in the month of August alone the shipments reached 2,322,890 ounces, or four times the average of the same month in the three previous years. This enormous export from Ceylon is driving the production of the oil in the Straits Settlements into the background.

Almond Oil.—Under this head reference is made to the advantage that would result in the improved color of almond oil if a practical method of blanching the almonds could be introduced. It would be an indispensable condition that the almonds should not require to be moistened, because otherwise the formation of the essential oil of bitter almonds would be induced and the fixed oil would acquire a strong bitter taste and contain a trace of hydrocyanic acid.

Cassia.—With respect to cassia oil Messrs. Schimmel state that the greater part of that found at present in commerce is sophisticated in the most shameful manner. The oil appears to be obtained by the dealers in Hongkong, Macao, and Canton through native agents who get it direct from the Chinese who produce it. As to the particular place from which it comes no information is available; only this is certain, that it is not manufactured in Macao, the place designated on all the labels. It is therefore thought most probable that it is sophisticated by the producer, and sent in this condition into the market. In Hongkong it is the custom among the dealers to have the oil examined in a "medical hall" and its genuineness certified. The value of this guarantee may be judged from the fact that a sample certified to be unadulterated oil of cassia, 1·060 sp. gr., dissolving readily in alcohol of 80° Tr. and perfectly volatile, proved to contain 20 per cent. of solid resin—colophony or pitch—and a corresponding quantity of petroleum, probably added to regulate the specific gravity and consistence. The three following brands are mentioned as having been found grossly adulterated: yellow label with the American eagle: Yan Loong, Macao; yellow label with sailing-vessel: Cheong Loong, Macao; rose-colored label with wreath of flowers: Luen Tai, Macao. The oil was noticeable superficially for its dark brown color and consistency. Upon shaking it in a flask it remained adherent to the sides for a long time. The specific gravity corresponded tolerably well with the statement in the certificate, varying between 1·052 and 1·065. The boiling-point lay between 200° and 265° C. As a residue after distillation there remained in the retort from 23 to 26 per cent. of a solid brittle resin. In order to exclude any doubt as to whether this resin might possibly have resulted through heating over an open fire, several canisters of each of these brands of oil were submitted to distillation in a current of steam. The greater part of the distillate sank in the water, but a portion collected on

---

*From the April *Bericht* of Messrs. Schimmel and Co. of Leipzig; reprinted from *Phar. Jour. and Trans;* April 6 and 20.

the surface and this lighter portion was identified as petroleum. In the residue after distillation there was found from 19 to 26 per cent. of the same solid brittle resin. On the other hand, a brand bearing a red label with the words, "Best Cassia Oil, Ying Chong, Macao," has been found to be of good quality, the loss on rectification being only 7 per cent., and the residue being liquid. The rectified oil should have a specific gravity of 1·055 to 1·065.

Eucalyptol and Eucalyptus Oil.—The demand for pure crystallized eucalyptol, for medicinal purposes, is said to be continually increasing. Of the *Eucalyptus Globulus* oil there seems to be a probability of over production, the yield from upwards of 3,000,000 trees in Algeria being now available, besides the Californian oil, which is already placed with difficulty. The use of the ordinary eucalyptus oil as a perfume is criticized and a passage is quoted with approval from Piesse's 'Art of Perfumery,' to the effect that so long as perfumery is an art of sweet odors such an oil cannot be described as a perfume. More favorable mention is made of oils distilled experimentally from *Eucalyptus maculata*, var. *citriodora*, and *E. Staigeriana*, as having a beautiful melissa odor; from *E. dealbata*, as having a fine lemon and melissa odor; and from *Backhousia citriodora*, as having an intense verbena odor. The cost of the materials is, however, too great to allow of these oils being produced as commercial articles. Another oil, of which samples have been received recently from Adelaide, South Australia, is described as having been distilled from the leaves of *Eucalyptus odorata*, a material of which there is an abundance available. The samples included the crude oil, sp. gr. 0·903 at 16° C., and the rectified oil, sp. gr. 0.909 at 18° C., both of which gave a strong eucalyptol reaction with hydrobromic acid, but no phellandrene could be detected. In addition there was some "residue from the rectification," which appeared to be the portion of the oil having the highest boiling point (boiling between 220° and 260° C.). This fraction, which is a brown liquid and has a sp. gr. of 0·945 is said to be sought after in Australia as a soap perfume. The odor is said to strongly resemble that of cuminol, the presence in it of which body has been detected.

Eucalyptol (Cineol) appears to be one of the most widely-distributed constituents of essential oils. Up to the present it has been found in the following oils:—

Oil.	Origin.	Discoverer.
Wormseed	*Artemisia Cina*	Wallach and Brass.
Cajeput	*Melaleuca Leucodendron*	Wallach.
Eucalyptus	*Eucalyptus globulus*	Jahns.
	E. amygdalina	Wallach and Gildemeister.
	E. Bayleyana	Schimmel and Co.
	E. microcorys	Schimmel and Co.
Rosemary	*Rosmarinus officinalis*	Weber.
Spike	*Lavandula spica*	Voiry.
Cheken leaves	*Myrtus Cheken*	Weiss.
Myrtle	*Myrtus communis*	Jahns.
Camphor	*Laurus Camphora*	Schimmel and Co.

Geranium Oil, Turkish.—This essential oil is said to be sometimes adulterated with fixed oils, cocoa-nut oil being used not unfrequently to the extent of 20 per cent. The adulteration can be detected by standing the flask containing the oil for some hours in a cooling mixture, when the cocoa-nut oil separates as a white substance.

Hop Oil.—The oil distilled from the unsulphured hops is said to be in good demand, whilst that distilled from lupulin appears to have gone quite out of use.

Iris Oil.—In the distillation of iris root the method of adding sulphuric acid in order to convert the starch into dextrin and glucose is frequently followed. In this way the yield of oil is increased, but the delicacy of its odor is said to be injured. The pure oil, free from myristic acid, which is largely present in commercial specimens, is described as worth its weight in gold.

Kesso-root Oil.—The Kesso root which in a previous report (see before, p. 327) was designated "Japanese valerian root," and attributed to *Patrinia scabiosæfolia*, Link., has been the subject of a communication from Mr. J. Murai, of Tokio. He says that the *Patrinia scabiosæfolia*, called by the Japanese "Ominameshi," and by the Chinese "Hai-sho"—literally, putrid soy—grows wild throughout Japan, but is collected for medicine only to a slight extent. The root is whitish, larger and harder than that of *Valeriana officinalis*, and does not smell so strongly after having been exposed to the air. Some *Patrinia* root collected and submitted to distillation last year by Mr. Murai yielded 0·25 per cent. of a deep green oil, having an odor quite different from that of valerian oil. On the other hand the Japanese valerian ("Kesso" or "Kanokoso") and the European valerian, both cultivated in the Botanical Gardens, Tokio, yielded respectively 3·78 and 1·69 per cent. of oil. He believes therefore that probably the "kesso root" distilled by Messrs. Schimmel was from *Valeriana officinalis*, L., var. *angustifolia*, and not from *Patrinia scabiosæfolia*, Link. In this opinion Messrs. Schimmel concur, since the "kesso root" worked by them was strikingly similar to European valerian root, and did not correspond to the above description of *Patrinia* root. The yield of oil obtained, however, from the sharply-dried root was about 8 per cent., though it is thought that this great difference in the yield may be due to Mr. Murai having used fresh undried root.

Petitgrains Oil.—The over-production of this article in Peru has greatly affected its value, and in large parcels it is said to be now quite unsaleable. In view of the possibility of stock remaining on hand a long time a hint is given as to the superiority of recent distilled oil.

Peppermint Oil.—In the case of peppermint oil also the consumption is considered not to stand in any sound relation to its enormously increasing production. The following is an estimate of the production of this oil in different parts of the world in 1888:—

		Kilos.
America—New York State	about	35,000
" Michigan State	"	27,000
England—Mitcham	"	5,000
" Cambridge and Lincolnshire	"	1,400
Japan	"	64,000
Italy	"	1,200
France	"	4,600
Germany	"	400
Russia		?
Total		138,600

Two samples of Italian peppermint oil examined gave the following results:—(1) "Foglie de Menta:" sp. gr. 0·921 at 19°; boiling point about 195°–222°; 44 per cent. distilled between 195° and 210°; 37 per cent. between 210° and 222°; residue 19 per cent. (2) "Fiori di Menta:" sp. gr. 0.915 at 190°; boiling point about 195°–222°; 57 per cent. distilled between 195° and 210°; 36 per cent. between 210° and 225°; residue 19 per cent. Neither sample gave a separation of menthol upon being placed in a freezing mixture. It is considered that according to these results both these oils range in quality below fine American oils. A sample of Russian peppermint oil gave:—Sp. gr. 0·908 at 20°; boiling point about 195°–222°; 46 per cent. distilled between 195° and 210°; 40 per cent. between 210° and 222°; residue 14 per cent. Placed in a cooling mixture the oil formed a thin paste; it contained consequently a small quantity of menthol.

Rose Oil.—Information is given as to the properties of a pure rose oil, and especially as to the characteristic stearoptene and the possible introduction of spermaceti. The stearoptene of rose oil is a hydrocarbon, C_nH_{2n}, which is not altered by boiling with alcoholic potash solution, whilst spermaceti, which is essentially palmitic-cetyl-ether, is saponified by that reagent, with the formation of potassium palmitate and cetyl alcohol. Upon this fact Messrs. Schimmel have based a method for the examination of the oil.

(1) Isolation and determination of the stearoptene. Fifty grams of oil are heated with 500 grams of 75 per cent. spirit to a temperature of 70° to 80°. Upon cooling the stearoptene separates nearly entirely. It is removed from the liquid and treated similarly with 200 grams more of 75 per cent. spirit, and this operation is repeated until the stearoptene is obtained perfectly odorless, a second treatment of the crude stearoptene being usually sufficient. In this way the following results were obtained with different samples of German and Turkish oil.

	Grams oil.	Grams stearoptene.	Per cent.
German, 1887	50	gave 16·2	=32½
" 1888	50	" 16·9	=34
Turkish, 1887	50	" 6·3	=12–13
" 1888	50	" 6·9	=14

(2) Determination of an Admixture of Spermaceti.—3–5 grams of the stearoptene are boiled for five or six hours in a return condenser with 20 to 25 grams of 5 per cent. alcoholic potash solution; the alcohol is then driven off and the residue treated with hot water. Upon cooling the greater part of the stearoptene separates on the surface as a crystalline mass. The alkaline liquor is then poured off, the stearoptene washed with some cold water, then again melted down with hot water, allowed to cool and the water poured off, and this is repeated until the wash-water is neutral. The united aqueous liquor is shaken twice with ether, to remove suspended stearoptene, and after separation of the ether is acidulated with dilute sulphuric acid and again extracted with ether, which upon evaporation should leave no residue (fat acid). As a check the stearoptene, including that withdrawn from the alkaline liquid, is dried at 90° and weighed. There will, however, be a small loss due to the volatilization of some stearoptene. In a control experiment

in which equal to 1·7 per cent. of spermaceti was added to a sample of Turkish oil 1·5 per cent. was recovered.

The melting-points of stearoptene from samples of German rose oil ranged from 35° to 36·5°; those of stearoptene from Turkish oil from 33·5° to 35°; that of the stearoptene from the oil to which 1·7 per cent. of spermaceti had been added was 31·5°–32°.

Rose oil, from which stearoptene has been removed in the above-described manner, is perfectly liquid at 0°; but when placed in a cooling mixture it solidifies to a gelatinous mass, so that it is not quite free from stearoptene. This liquid oil is described as having an extraordinarily fine powerful odor, and as presenting the advantage that when used dissolved in spirit it does not give rise to any crystalline separation.

The following new oils have been prepared experimentally by Messrs. Schimmel during the last six months:—

Mountain Wormwood Oil.—A distillate of the herb *Artemisia glacialis*, known in commerce as "genepi herb" (*genepi des alpes*). One hundred kilograms of the herb yielded 250 grams of an essential oil sp. gr. 0·964 at 20°, which solidified to the consistence of butter at 0°, in consequence of it containing a fat acid melting at 61° C. The boiling point of the oil was between 195° and 310°. It had an unusually powerful aromatic odor, and it is thought it might be suitable for making "Benedictine" and "Chartreuse," for which purpose the herb is said to be used in France.

Bear-root Oil.—Distillate of the root of *Meum anthamanticum*, Jaq. 100 kilos of the dried root of commerce gave 670 grams of a dark yellow essential oil, the odor of which much resembled that of lovage. Sp. gr. at 21° 0·999. It commenced to boil at 170°, but the temperature mounted to above 300°, when a green-blue fraction passed over, having a celery odor.

Carlina Root Oil.—Distillate of the root of *Carlina acaulis*. From 100 kilos of dried root was obtained 2 kilos of an essential oil having a heavy narcotic odor, of which one-half boiled between 265° and 300°, when decomposition commenced; the remainder resinified. Sp. gr. 1·030 at 18°. This oil is recommended as worthy of a scientific investigation.

Muscatel Sage Oil.—Distillate of the herb and flowers of *Salvia sclarea*, the so-called "muscatel sage," a plant growing wild in Southern Europe and the east, and cultivated in South Germany. The oil has the characteristic spicy odor and taste of the herb. The yield amounts to only one-fifth per cent., and probably the cost of its production would be too high to allow of it coming into practical use.

Onion Oil.—The pure essential oil of the common onion (*Allium Cepa*). About 5000 kilos of onions yielded 233 grams of a red-brown oil, sp. gr. 1·036 at 19°. The same yield leads to the presumption that during distillation a loss occurs through decomposition. On the other hand, as the onion consists of 90 per cent. of water and only 10 per cent. of solid substance, the result from this point of view appears less unfavorable.

The following distillates have been received from Japan:—

Hinoki Oil.—The essential oil from *Retinospora obtusa*, a plant occurring frequently in Japan, resembling savin or thuja oil in odor. Probably without practical value. The low boiling point of this oil is remarkable: about one-half of its volume passes over between 110° and 160° C. and the remainder between 160° and 210°.

Kuro-moji Oil.—Essential oil from the leaves of *Lindera sericea*, Bl., a lauraceous shrub widely distributed in Japan. The oil has a very fine aromatic balsamic odor, and might, it is thought, find use in perfumery, especially as it is not expensive. Sp. gr. 0·901 at 18°. A sample separated by distillation into three fractions gave (1) between 180° and 200°, a fraction having the agreeable odor of myrtle and coriander; (2) boiling between 200° and 220°, a fraction with an agreeable balsamic odor, recalling somewhat lign-aloe oil, but finer and more fragrant; (3) boiling between 220° and 240°, a fraction resembling the carvol contained in curled mint.

Coumarin.—The following list of plants in which the presence of coumarin has been detected, is quoted from a communication by H. Lojander upon the distribution of coumarin in the vegetable kingdom:—

Orders.	Genera and species.	Part of plant.
Filices	*Adiantum pedatum*	Plant.
	A. peruvianum	Plant.
	A. trapeziforme	Plant.
Palmæ	*Phœnix dactylifera*	The date.
Gramineæ	*Anthoxanthum odoratum*	Flowers.
	Cinna arundinacea	Plant.
	Hierochloa alpina	Plant.
	H. australis	Plant.
	H. borealis	Rhizome.
	Milium effusum	Plant.
Orchidaceæ	*Aceras anthropophora*	Plant.
	Angræcum fragrans	Leaves.
	Nigritella angustifolia	Plant.
	Orchis fusca	Plant.
Caryophyllaceæ	*Herniaria glabra*	Plant.
Rutaceæ	*Ruta graveolens*	Plant.
Papilionaceæ	*Dipterix odorata*	Ripe seed.
	D. oppositifolia	Ripe seed.
	D. Pteropus	Ripe seed.
	Melilotus albus	Flowers and plant.
	M. altissimus	Flowers and plant.
	M. hamatus	Flowers and plant.
	M. leucanthus	Flowers and plant.
	M. officinalis	Flowers and plant.
Cassiaceæ	*Toluifera balsamum*	Fruit.
Apocynaceæ	*Alyxia stellata*	Bark.
Rubiaceæ	*Asperula odorata*	Plant.
	Galium triflorum	Plant.
Compositæ	*Liatris odoratissima*	Plant.
	L. spicata	Plant.

In addition, Molisch and Zeisel have reported the occurrence of coumarin in *Ageratum mexicanum*, Sims. This plant, when dry, smells of coumarin, of which it yielded 0·06 per cent.; but when in fresh condition, has quite another odor, probably derived from an essential oil.

Thymol.—Reference is made to the occurrence in commerce of thymol containing thymene, which can be recognized by its odor, or by the oil stain left upon pressing a fragment between blotting paper. The following method is given for its more exact determination: Pure thymol dissolves clear in five times its weight of 10 per cent. soda solution when heated to 30° or 40° C., the solution being colorless or faintly reddish, but darkening upon standing. If the thymol contains thymene it gives a more or less turbid solution, from which the thymene separates in the form of oil drops.

Musk.—The following information as to the manner in which musk comes into commerce is quoted from a report by the German consul at Shanghai: "The article comes into the market in simple wood cases of 9 to 14 catties. Every parcel contains a number of adulterated pods, which have also to be bought. The parcels are then, as a rule, broken up by the exporter and sorted for the London market. On an average they give about 50 to 55 per cent. of 'pile I,' a fine thin-skinned article; 20 to 30 per cent. of 'pile I and II,' partially or entirely falsified pods; and 20 to 25 per cent. of skin refuse and loss of weight. The sophistication consists of earth, rasped wood, and small pieces of leather or skin, which are inserted in the pods after the musk has been removed. Less frequently the sophistication is effected with lead, heavy pieces of flesh, or paper inserted between the thin inner and thick outer skin, which can only be discovered upon cutting it. In the last year or two the adulteration has gone up to 80 per cent., but in the absence of better qualities, even such an article has found buyers."

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

Louisville College of Pharmacy.—The Board of Directors has purchased the property on the S. W. cor. of First and Chestnut streets, which has a frontage of 200 feet and depth of 150 feet; the building is one of the handsomest in the city, and well adapted for the college. A pharmaceutical and a microscopical laboratory will at once be added. The college will take possession of the property about July 1st, on which occasion it is proposed to give an old-fashioned house warming.

St. Louis College of Pharmacy.—The vacany occasioned by the resignation of Professor Curtman has been filled by calling Professor Gustavus Hinrichs, M. A., LL. D, to the chair of chemistry. Professor Hinrichs for a number of years has held the chairs of chemistry, toxicology and climatology in the medical and pharmaceutical departments of the University of Iowa. His experience as a teacher and his reputation as an author give ample promise of his usefulness in this new sphere of labor.

The School of Pharmacy, University of Kansas, celebrated its fourth anniversary June 3rd, the exercises consisting mainly of orations and addresses.

The Alabama Pharmaceutical Association held its eighth annual meeting at Birmingham May 14th, Vice-President G. W. Bains in the chair. Reports were received from officers and committees and papers were read on carbonate of ammonium and the National Formulary. The present officers are: President, G. W. Bains, Birmingham; Vice-Presidents, W. F. Punch, Mobile, and J. Milner, Florence; Secretary, P. C. Candidus, Mobile, and

Treasurer, E. P. Galt, Selma. The next meeting will be held at Tuscaloosa, May 13, 1890.

The Arkansas Association of Pharmacists held its seventh annual meeting at Little Rock on June 11-13, called to order by President Kerr. The president's address was mainly devoted to the causes that defeated the pharmacy law at the last session of the Legislature, and to suggestions which would lead to the passage of a law at the next session. A committee was authorized to prepare a line of pharmaceuticals made according to the National Formulary to be exhibited before the State Medical Society. The papers read at the meetings were: Some of the Difficulties in Compounding Prescriptions by John Laird; Chemistry and Some of its Pigments by E. T. Mitchell and Syrups by Percolation by J. A. Jungkind. The officers were re-elected for the ensuing year, and are: President, W. W. Kerr, Batesville; Vice-Presidents, J. E. Gibson, Little Rock, and E. E. Shendall, Hot Springs; Secretary, J. W. Beidelman and Treasurer, E. P. Shaer, both of Little Rock. Pine Bluff was selected for the place of meeting one year hence.

Proceedings of the Connecticut Pharmaceutical Association at the thirteenth annual meeting &c., 8vo. Pp. 99.

A brief account of the transactions will be found on page 222 of our April number. Next meeting at Danbury, February 4 and 5, 1890; F. G. Bodine, local secretary.

The Delaware Pharmaceutical Association met in Wilmington, May 2. Trade interests and the pharmacy law were the main topics discussed. The executive officers were re-elected for the current year, viz.: H. R. Bringhurst, president; J. M. Harvey, secretary; J. J. Gallagher, treasurer, and H. C. Moore, local secretary, all of Wilmington.

The Kansas Pharmaceutical Association assembled at its tenth annual meeting in Atchison, May 15th, President W. W. Naylor in the chair. The president's address and the reports of officers and committees were received and action taken thereon. Among the papers read the following may be mentioned: Medicated waters, by R. L. Igel; commercial quinine, by E. L. Beckers; commercial caustic soda and potash, by G. F. Weida; commercial alum, by Mary A. Rice; cocaine, by W. P. Brown; adulterations and impurities, by H. L. Raymond; organic compounds and calomel, by Professor E. H. Baily; on the National Formulary, by C. L. Condery and F. Edel; coloring matters of red saunders, by H. M. Curry; Pharmaceutical Education, by Professor L. E. Sayre. The officers elected to serve for the present year are J. P. Allen, Wichita, president; C. D. Barnes and S. H. Horner, vice-presidents; J. T. Moore, Lawrence, secretary; A. T. Waggoner, Topeka, assistant secretary, and H. W. Mehl, Leavenworth, treasurer.

The Kentucky Pharmaceutical Association held its twelfth annual meeting, May 15 and 16, at the Crab Orchard Springs, President W. F. Johnson in the chair. The President's address and the reports of officers and committees were received. An amendment to the pharmacy law was recommended, extending its provisions to towns of 100 inhabitants. The subject of cut prices was discussed in its various bearings. Papers were read by Dr. J. P. Barnum on the Mineral Waters of Kentucky, and by W. Chapman on Fluid Extract of Liquorice suitable for quinine mixtures. The following officers were elected: E. C. Pfingst, Louisville, president; J. J. Brooks, Richmond, W. B. McRoberts, Stanford, and C. F. Edmunds, Glasgow, vice-presidents; J. W. Gayle, Frankfort, secretary; and E. W. Lillard, corresponding secretary; and W. S. Johnson, Henderson, treasurer. The next meeting will take place at Richmond on the third Wednesday of May 1890.

The Nebraska Pharmaceutical Association convened at its eighth annual meeting in Lincoln, May 1st, President Shryock in the chair. The address of the president, the report of officers and committees, and various matters, under the head of trade interests claimed the attention of the meeting: Papers were read on Household Poisons, by Prof. Nicholson; on the Microscope, by Prof. Whelpley; on the Waters of Nebraska, by A. H. Keller; and on Fluid Extracts, by C. L. Mullen. Mr. C. F. Goodman of Omaha, was elected president; C. J. Daubach, Lincoln, secretary; Jas. Forsyth, Omaha, treasurer and S. A. Hereth, Omaha, local secretary for the meeting to be held at Omaha on the second Tuesday of May, 1890.

The Ohio Pharmaceutical Association convened in annual session in Mansfield on June 4th, President Fulton presiding. The first day's sessions were devoted to the reading of the president's address and the reports of the other officers and committees; the election of officers, resulting as follows: President, L. Sherwood, Columbus; Vice-Presidents, A. H. McCullough, Mansfield, and F. M. Heath, White House; Treasurer, F. A. Kautz, Cincinnati; Executive Committee, Philip Acker, Cleveland, J. H. Von Stein, Sandusky, and M. A. Burkhardt, Dayton; and the reading of the following papers: Uncertain Medicines by J. U. Lloyd, Nux vomica by W. Simonson and Powdered Borax by Mary H. Spenzer. In the second day's sessions, next year's meeting was decided to be held at Toledo, on the second Monday in June; six papers were read: Three on Commercial Glycerin by E. S. Ely, J. G. Spenzer and John G. Buehler; Glycerin: Vegetable and Animal by J. G. Spenzer; Ammonium Chloride by Mary H. Spenzer; and Commercial Chloride of Lime by E. A. and J. G. Spenzer. An interesting exhibit was one of the attractions.

The Pennsylvania Pharmaceutical Association held its twelfth annual meeting in the hall of the Young Men's Christian Association in the city of Scranton, commencing June 4th. President Wm. Harris presided; Dr. J. A. Miller, secretary. Mr. Morgan, chairman of the local committee, read a letter of welcome from Mayor E. H. Ripple whose time was now occupied with duties connected with the relief of the sufferers from the calamity in the Conemaugh Valley. President Harris responded and then read his annual address in which he referred to the various projects proposed for retaining and increasing the membership. He suggested the appointment of several new committees, viz. one on botany to promote its study, ascertain localities of plants and collect material for publishing a catalogue of Pennsylvania plants; also a committee on chemistry to promote its study by pharmacists; and one on remedies, to report annually upon such which have been introduced during the years. Inter-state meetings of pharmaceutical associations were suggested as being productive of interest. The relations to the State Medical Association were alluded to, and legal measures were recommended for preventing the further spreading of secret nostrums and fraudulent medicines. The address was referred to a committee and several of the suggestions were subsequently adopted.

Propositions for membership were read, and during the meeting forty-nine new members were elected.

A resolution was passed inviting the members of the medical profession of Scranton and vicinity to attend the meeting.

The secretary's report showed a total amount of $1,345.01 having been received; the expenditures were $914.44, leaving a balance of $430.57on hand.

The secretary's report dealt mainly with the published proceedings and with the roll of members.

The following officers were elected for the ensuing year and installed at the last session: President, J. W. Miller, Allegheny City; Vice-Presidents, J. H. Stein, Reading, and J. F. Patton, York; Executive Committee, J. H. Redsecker, C. T. George and Wm. Harris. Secretary Miller and Treasurer Lemberger were re-elected.

Greetings were ordered to be sent to the meetings of the New York, Ohio and Iowa associations.

Professor Trimble read the report of the Committee on Adulterations, of which an abstract will be found on another page.

Reports from various delegations and from special committees were received. Considerable discussion was created about a plan submitted with the view of securing to the pharmacist the full retail price of what was called "legitimate patent medicines." There was much opposition to the consideration by the association of any question relating to the recognition of nostrums; but finally a special committee was directed to be appointed for the purpose of reporting next year a feasible plan if such could be devised.

The interchange of certificates of pharmacy boards was not favored by the association; but the repeal of the special government tax for the sale of alcohol and the reduction of the tax on the manufacture of alcohol were approved.

The following papers were read during the sessions:

On the relation of pharmacists to the Sabbath, by J. W. Miller. The paper stated that a number of pharmacists of Allegheny County were fined for trivial sales under a special law applying to that county, and that efforts had been made, but without success, to repeal that special law. Considerable discussion was had on various details mentioned in the paper which was finally withdrawn, and a resolution was adopted urging druggists to confine their *Sunday business* to works of necessity and mercy.

The efficiency of pharmaceutical associations was discussed in a paper by Dr. Reed, and the need of a more thorough organization by pharmacists by W. L. Turner.

Tincture of strophanthus was recommended by Geo. W. Kennedy to be made of the strength 1:20, using eighty-five per cent. alcohol for the menstruum.

Medicated waters. After experimenting with different materials, J. H. Stein prefers paper pulp for the division of the volatile oils.

Paste, suitable for attaching labels to metal or glass is prepared by J. F. Patton from flour, by converting the starch partly into dextrin by boiling in the presence of a little hydrochloric acid, and adding a small quantity of borax and alum, two drachms of each to one pound of flour. The addition of a little oil of gaultheria will prevent fermentation.

The preservation of infusions was in part reported on by J. L. Lemberger, who will continue his investigations. Mr. England's paper on infusion of digitalis is published in this number.

Glycerin suppositories are made by J. L. Lemberger by digesting a good quality of gelatin (gold label) in glycerin and pouring into brass molds thoroughly chilled. In this manner suppositories are readily made containing 90, and even 95 per cent. of glycerin, of which the former keep well in lycopodium, but the latter are best wrapped in tinfoil owing to their hygroscopic nature.

Six statistical papers on the drugs and preparations prescribed by physicians were referred for publication. Mr. Patton was granted time for finishing his paper, on the production of oil of sassafras in Pennsylvania, for the proceedings.

Poplar bark was the subject of a paper by C. A. Heinitsh. This name is popularly used for the bark of Liriodendron as well, as for that of Populus tremuloides. Both barks are to some extent employed in domestic medicine, and the last named bark is also used for the preparation of *salicin.*

A paper on the useful plants of the genus Psoralea by Prof. Maisch is published in the present number.

The following resolutions offered by Mr. Lemberger were adopted :

Whereas: A most dreadful calamity has befallen a portion of our State by flood, entailing death and destitution unparalleled in the history of our country, causing affliction, sorrow and loss beyond estimate, therefore be it

Resolved: That this association tenders an expression of sympathy for the afflicted and pledge our aid as individuals in our several communities to the fullest extent of our ability.

Resolved: That we feel especially solicitous for those of our members who may be afflicted by this sad visitation, and desire that they may realize our feelings in their behalf and in their absence.

After installing the officers, appointing different committees and passing resolutions of thanks the Association adjourned to meet next year in York on the second Tuesday of June. James A. Dale was elected local secretary.

On Wednesday morning the visiting members and their ladies were escorted to the Oxford coal mine, and in the evening a visit was made to the steel works. On Thursday an excursion was made to the Delaware Water Gap, whence the members returned to their homes.

The Texas Pharmaceutical Association met at its tenth annual meeting in

Dallas, May 14, President J. W. Gresham in the chair; L. M. Connor acting secretary. The president presented an address, and the different officers and committees made reports. The discussion of the pharmacy law resulted in the suggestion of several desirable amendments. Papers were read on antipyrine by J. Kennedy, and on mixtures of calomel and milk sugar by W. Kendall. The officers elected are J. L. Williams, Dallas, president; T. F. Meyer, W. B. Morrison and H. L. Carleton, vice presidents; L. M. Connor, Dallas, secretary; E. W. Marshall, Lancaster, treasurer; and F. Drice local secretary for the next meeting to be held in San Antonio on the second Tuesday in May, 1890.

EDITORIAL DEPARTMENT.

False senega and Southern senega.—In several essays on senega published during the past year the editor of this Journal has been quoted as having stated somewhere that "Southern senega is procured from Polygala Boykinii." The latest quotation of this nature is found in a very creditable paper by Ludwig Reuter in *Archiv der Pharmacie*, April 1889 p. 311.

In order to forestall similar erroneous references in the future we desire it to be noted, that we have *never*, in writing or verbally, made such an assertion. What we did say, and here repeat, is that false (keelless) senega was first noticed by us in 1876; that subsequently we traced a commercial lot to Southwestern Missouri, but were not successful in ascertaining the exact locality where it had been collected, or in obtaining specimens of the plant with root attached; and that after Dr. Gunn of Alabama called attention to the virtues of Pol. Boykinii, we obtained from him a single plant with root, the latter agreeing in appearance and structure with the false senega, though somewhat smaller than the commercial article of the keelless root. Since we have in our possession specimens of true senega root from several of the Southern states, it would be ridiculous for us to asert that Southern senega was not collected from Pol. Senega.

When at the meeting of the American Pharmaceutical Association in 1881 Prof. Loyd exhibited the Northern senega in which the keel was usually less distinct than ordinarily, we stated that these roots were much larger—and we might have added also much darker in color—than the keelless senega; and until the latter can be procured—plant with root attached—we feel disposed to regard it as being the product of a species differing from Pol. Senega, and possibly from Pol. Boykinii.

The Pennsylvania Pharmacy law has been supplemented by an act of which the following is a correct copy.

A Supplement to an act entitled "An act to regulate the practice of pharmacy and sale of poisons, and to prevent adulterations in drugs and medicinal preparations in the State of Pennsylvania," approved May twenty-fourth, one thousand eight hundred and eight-seven.

WHEREAS, a number of persons who were actually engaged in the retail drug and apothecary business in this State at the date of the approval of the act of May twenty-fourth, one thousand eight hundred and eighty-seven, failed to apply for registration within the limited period of ninety days provided for that purpose; therefore,

SECTION 1. *Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same,* That any person who was entitled to registration as a pharmacist, as provided in Section three of the act entitled "An act to regulate the practice of pharmacy and sale of poisons, and to prevent adulterations in drugs and medicinal preparations in the State of Pennsylvania," approved May twenty-fourth, one thousand eight hundred and eighty-seven, and who failed to apply for registration within ninety days as provided in said act, may make such application at any time within ninety days after the passage of this act, with the same force and effect as if such application had been made within the ninety days provided in the act of May twenty-fourth, one thousand eight hundred and eighty-seven.

Approved the fourth day of May, A. D. 1889.

In order to carry out the provisions of this supplementary act the State Board has issued the following circular dated May 4th, which also explains certain provisions of the law, which appear to be not generally understood:

The State Pharmaceutical Examining Board hereby gives notice to all persons who are actually engaged in the retail drug and apothecary business in Pennsylvania, either as proprietors or assistants, at the date of the approval of the Pharmacy Act of May 24th, 1887, but who failed to secure registration thereunder.

That a recently enacted supplement to said act re-opens registration for a period of ninety days after the fourth day of May, 1889.

The sole object and intent of the supplement is to re-open registration for such persons *only* as were entitled to register on May 24th, 1887, but who failed to apply within the ninety days provided in the original act, and only for such a certificate of registration as they were entitled to on May 24th, 1887.

Blank forms of application may be obtained from the Secretary of the Board, H. B. COCHRAN, Lancaster, Pa., to whom all applications for registration must be sent, accompanied by the registration fee of one dollar (either U. S. note, money order, or postal note). All applicants for blanks should state distinctly which certificate they desire to apply for.

Firms, as such, cannot register; each individual member of a firm must obtain a separate certificate. Titles, such as The City Drug Store, Empire Pharmacy, or the Union Drug Company, cannot be registered.

A printed card or label should be attached to the application for registration, in order to avoid possible error in spelling the name on the certificate.

The certificates will be furnished as promptly as possible; but even should no unforeseen cause of delay occur, several months time may be required.

Every registered proprietor or manager shall keep his certificate conspicuously displayed in his place of business.

Do not forget that the privilege of registration granted under the supplement will continue only ninety days after the fourth day of May, 1889.

This time will expire on the second day of August, 1889; the Board has no power to extend it.

General country storekeepers are not entitled to or required to obtain registration. A clause in section six of the act permits such storekeepers to deal in and sell the commonly used medicines and poisons, under certain restrictions, which are fully explained in a circular issued by this Board.

The Board desires to distinctly point out the fact that only such persons as were actually engaged in the retail drug and apothecary business in Pennsylvania, on May 24th, 1887, and who continue to reside in said State, are eligible for registration under the supplement.

An International Congress of Therapeutics and Materia Medica will be held in the city of Paris, France, August 1st to 5th next. Among the five subjects coming up for consideration are two of especial interest and importance to pharmacists, namely:

Question IV. The new drugs of vegetable origin introduced during the past ten years. Professor Planchon will report on this subject.

Question V. Unification of measures and weights in formulas, and the utility of an international pharmacopœia. Professor Schaer, of Zurich, will report on these subjects.

Communications intended for the Congress should be addressed to the Secretary of the Committee on Organization, Dr. G. Bardet, rue Notre Dame des Champs, 119, Paris.

The International Congress of Hydrology and Climatology will convene in Paris October 3rd to 10th next. The secretary general is Dr. F. de Ranse, whose address during the summer months is at Néris, Allier, France.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

A Guide to Therapeutics and Materia Medica. By Robert Farquharson, M. P., M. D., etc. Fourth American from the fourth English edition, enlarged so as to include all preparations officinal in the U. S. Pharmacopœia, by Frank Woodbury, A. M., M. D., etc. Philadelphia: Lea Brothers & Co., 1889. 12mo. Pp. 598. Price, $2.50.

The introductory portion treats of the different methods of medication; the writing of prescriptions; weights and measures; classification of drugs, etc. The drugs are arranged in alphabetical order, the galenical preparations being considered with the drugs. The work being primarily intended for the use of the physician, and more especially of the medical student, the text is mainly devoted to the physiological action of the drugs, their therapeutical uses, mode of administration, necessary precautions, antidotes, etc.; and great care has been taken to make the information comprehensive and practical, embodying all that is essential within the scope of the work. Following the officinal drugs a number of non-officinal drugs and preparations are noticed in a similar, but more concise, manner; then follows a chapter on poisons and the treatment of poisoning, and a well prepared epitome of the National Formulary recently issued by the American Pharmaceutical Association. Tables showing the relation of weights and measures, an index of diseases, and a general index take up the remaining pages.

Like the preceding editions, the present one will commend itself to those for whom the work was originally prepared. It does not aim to supersede more elaborate works on therapeutics; but in presenting the subject in a rather brief compass, and unencumbered by botanical, chemical and pharmaceutical detail, it will continue to serve a very useful purpose as a handy reference book on therapeutics and materia medica.

Der Kohlensäure-Gehalt der Luft in und bei Dorpat, bestimmt in den Monaten September, 1888, bis Januar, 1889. Von Eugen von Frey. Pp. 49.

The amount of carbonic acid in the atmosphere of and near Dorpat from September, 1888, to January, 1889. A continuation of the work by J. Heimann, which was noticed on page 271.

Vergleichende Untersuchungen der wichtigeren zum Nachweise von Arsen in Tapeten und Gespinnsten empfohlenen Methoden. Von Nicolai Jorban. Pp. 71.

Comparative examination of the more important methods recommended for the detection of arsenic in wallpapers and textile materials.

The methods recommended by Dragendorff, Thoms, Lyttkens, Schmelck, Flückiger, Reichard, and Fleck have been examined; also those prescribed for the above purpose, by law, in Sweden and in Germany. Since exceedingly minute quantities of arsenic are readily detected, and since this metal is widely distributed in nature, the absolute freedom from arsenic of the above articles cannot be expected in all cases; hence the importance of the determination of the limits allowable without injury to the human health.

Die officinellen Croton- und Diosmeen-Rinden der Sammlung des Dorpater Pharmaceutischen Institutes. Von Friedrich Lichinger. Pp. 52.

The officinal barks of croton and diosmeæ in the collection of the Pharmaceutical Institute of Dorpat.

The investigation comprises barks like cascarilla, copalchi, malambo, angustura and allied (esenbeckia) barks. Aside from the local interest attached to the careful examination of the specimens, the pamphlet is quite valuable on account of the extensive literature on these subjects, which has been collected with circumspection and critically arranged.

Second biennial Report of the North Carolina Board of Health to the General Assembly of North Carolina. Session of 1889. Raleigh, 1889. 8vo.; pp. 191.

Besides the report of the Board and its Committees, the pamphlet contains also a number of papers of general interest: by Dr. Thos. F. Wood, on the causes of death and suggestions about the future of prevention; by Dr. F. P. Venable, on foods contaminated with metallic poisons, and on the quality of quinine, bismuth and laudanum; by J. L. Ludlow, C. E., on the sewerage of cities and towns, etc.

THE AMERICAN
JOURNAL OF PHARMACY.

AUGUST, 1889.

ON THE DISPENSING OF POWDERS FOR PRESCRIPTIONS.

By Thos. S. Wiegand.

In some of the recent issues of the drug journals the dispensing of medicines in powders has been made a subject of remark. While this form of exhibiting medicines is one of the simplest, it still must be admitted that as frequently done, even in stores of good reputation, there is a great deal of inaccuracy in the performance. In the preparation of the materials which, when compounded, form the remedy, the exact and thorough mixture of all the components frequently is not effected. Where morphine, arsenious acid, or corrosive sublimate are ordered, the division of any of these is secured by the use of a triturate of the active remedy with sugar of milk, using eight grains of the triturate to represent one grain of the remedy; these triturates are frequently kept on hand, thus making the diffusion eight times more certain.

The order in which the materials are put into the mortar is quite important, and the kind of mortar used is also to be regarded; a close-grained porcelain mortar free from any uneven places, or little flaws or holes, should always be selected for the purpose.

A small portion of sugar of milk or the mildest ingredient is triturated in the mortar to prevent the active ingredient from adhering to the surface; after this the most active remedy is added and rubbed with that already in the mortar until thoroughly mixed, when the other active ingredients are to be added, each being well mixed with the others, and, lastly, the remainder of the least active material is added and thoroughly mixed.

The proper division of the powder into the number of papers directed is next to be accomplished. Very ingenious apparatus have been made to effect this purpose, but as yet few have been sold so far as my experience extends. The commonest way for dividing and the least reliable is to guess at it by taking out on the end of the spatula about as much as the operator thinks will make the proper quantity for one paper, and having distributed the whole quantity into the number of papers ordered, those which *seem* to be either too light or heavy are corrected; this it need only be said is *guessing* about the division.

Another and much better method is to spread the powder to be divided upon a ground-glass plate, arrange it into a parallelogram of even thickness, and mark off the number of parts into which it should be divided with a straight edge spatula across the plate. Those who practice this method succeed in making divisions that are within a fraction of a grain. Greater accuracy can be attained by using a glass slab to the underside of which has been pasted a piece of letter paper upon which have been ruled six or eight parallel lines; at right angles to these an equal number of lines have also been ruled, all at equal distances; at the margins of the paper the numbers 1, 2, 3, etc. are made between the lines so that any given number can be made by multiplying one number by any other that will give the desired number of powders. When odd numbers such as 13, 17 or 19 are ordered the best plan is to weigh off the 13th, 17th, or 19th of the whole weight and then the remainder will be very readily divided in the manner above described. For those who prefer a more finished affair than that just described, the glass slab should have the edges bevelled, and the lines etched on it, the figures being engraved on the bevelled edge.

HYPOPHOSPHOROUS ACID AND THE OFFICINAL HYPOPHOSPHITES.

By Frank X. Moerk, Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 55.

II. EXAMINATION OF OFFICINAL HYPOPHOSPHITES.

Before taking up this part of the subject a correction must be made and some additional experiments recorded under the bromine method. On page 332 the value of 1 cc. NaOH is stated to be 0·01685 gm. KH_2PO_2 this should be 0·01735; the additional experiments have reference to some impurity in the bromine used which necessitates a correction to be made, otherwise too high results will be obtained. If 1 cc. of bromine (the quantity usually taken for a determination of hypophosphite) be moderately warmed with 100 cc. water for one-half hour and then, by boiling, the bromine entirely volatilized, while the solution is neutral to litmus indicating the absence of acids, the addition of a few drops of phenolphthalein is the cause of a greenish color and, after adding more indicator 0·3 cc. NaOH had to be added to produce an alkaline reaction. This correction (the subtraction of 0·3 cc. NaOH from the quantity of NaOH needed to neutralize the acids formed in the oxidation) had to be made in the examination of H_3PO_2, KH_2PO_2, $NaH_2 PO_2$ and $Ca (H_2 PO_2)_2$. When first using this method in the examination of ferric hypophosphite it was noticed, in boiling to free the solution from bromine, that the solution became opalescent without depositing a precipitate (it was since observed that by protracted boiling a precipitate will form); that the opalescence was not due to the presence of ferric phosphate was proven by the prolonged boiling of the simulated mixture, made without the use of bromine, giving a perfectly clear solution. Discovering the impurity in the bromine as described above, the probability that the cause of the opalescence was to be found in the bromine was verified by experiment and at the same time the correction for ferric hypophosphite ascertained. 10 gm. of a dilute ferric chloride solution were precipitated by addition of normal sodium hydrate until, after boiling, phenolphthalein indicated an alkaline reaction; it required 6.5 cc. NaOH. To 10 gm. of the same solution diluted to 100 cc. was added 1 cc. bromine and, after one-half hour's warming, the bromine expelled by boiling; the opalescence was noticed as soon the solution boiled actively; it required now 7 cc. NaOH to produce an alkaline reaction making a correction of 0·5 cc. NaOH necessary in the examination of ferric hypophosphite.

Using only the one sample of bromine in my work, it is impossible to state to what extent this impurity is met with in commercial bromine; but the above experience is sufficient to draw attention to a possible source of error in hypophosphite determinations.

The examination of the officinal hypophosphites disclosing a number of foreign substances some of which are difficultly estimated, the methods used are described as briefly as possible.

Hypophosphite determination.—With the *soluble salts* no difficulty whatever is encountered either with the $HgCl_2$ or the Br method.

The *insoluble salt,* $Fe_2(H_2PO_2)_6$ was the cause of much work, the result of which establishes the superiority of the bromine method and the unreliability of the $HgCl_2$ method in determining ferric hypophosphite. The objection to the latter method is that the insolubility of this salt demands it to be first brought in solution, by use of HCl, before the addition of $HgCl_2$; in dissolving, however, a portion of the ferric salt (more or less, depending on conditions) is reduced to ferrous, with simultaneous oxidation of the hypophosphite, which does not reduce mercuric chloride; hence, the results are low; if the hypophosphite be not dissolved the particles coming in contact with the separated mercurous chloride reduce this to metallic mercury and loss again results. If heat be applied to assist the solution of the iron salt, the results are still lower. One sample by Br method gave 98·80 per cent. $Fe_2(H_2PO_2)_6$; with $HgCl_2$ method using 5 cc. HCl and 5 cc. water to dissolve the hypophosphite and then adding the $HgCl_2$ and 10 cc. water before heating, working as rapidly as possible, only 94·82 per cent. was obtained; working more leisurely in dissolving the salt 84·73 per cent. resulted. Another sample with Br gave 90·32 per cent.; with $HgCl_2$, as above, working rapidly, 89·28 per cent; applying a little heat in dissolving, 86·41 per cent.

The difficulties encountered in the Br method were too high results due partly to the bromine but, chiefly, to the ready decomposition of ferric phosphate in the titration with NaOH. No indicator was found with this salt which would indicate sharply the change of acid phosphate into normal phosphate: Phenolphthalein was useless because it only produces the red color in alkaline solution, even if a slight excess of NaOH was added this would instantly react with the ferric phosphate and a neutral solution result; by the time an alkaline reaction was obtained the greater part of the ferric phosphate had been decomposed; Methyl-orange and Tropaeolin OO do not appear to be sensitive towards acid phosphates even after addition of calcium chloride; Congo-red and Litmus, sensitive to acid phosphates after addition of calcium chloride (the former only after warming), can be made to give fair results but the end-reaction is rather indistinct owing to formation of lakes with the iron phosphate. This objectionable feature was overcome by completely decomposing the ferric phosphate by addition of normal NaOH to the boiling hot solution of ferric phosphate (after addition of the $CaCl_2$) until phenolphthalein indicated an alkaline reaction. This procedure, however, necessitated another determination *i. e.* the quantity of NaOH necessary to decompose the ferric hypophosphite (see determination of ferric oxide). To obtain the number of cc. of NaOH corresponding to the ferric hypophosphite, there must be subtracted from the cc. NaOH required to indicate an alkaline reaction after oxidation, the correction due to the bromine and the number of cc. NaOH necessary to precipitate the ferric oxide from the ferric hypophosphite taken. One other precaution must be observed with this salt, it is best obtained in solution by using 10 cc. water with sufficient bromine, applying slight heat and agitating well until dissolved, then diluting with water to 100 cc. and boiling as with the soluble salts.

The results of these determinations were always calculated as the hypophosphite of the metal taken, and if after the determination of the impurities the figures fell short of 100, the determination of phosphoric acid (after oxidation) was undertaken so as to estimate the quantity of phosphite by the method given on page 327. Regarding the qualitative test for phosphite mentioned on page 326, an unfavorable opinion previously formed was strengthened, as a sample containing quantitatively 13·34 per cent. phosphite gave no precipitate with the test, and a sample of hypophosphorous acid, free from phosphorous acid, but containing sulphuric acid giving a heavy precipitate.

Water determination, by drying about two gm. at 120° C.

Sulphuric acid determination, by use of $BaCl_2$ and HCl.

Hydrochloric acid determination presents some difficulties in the presence of hypophosphites owing to the reduction of silver nitrate by the latter. It can be detected and estimated by dissolving the salt in nitric acid, sp. gr. 1·20, and adding $AgNO_3$ until a dark coloration sets in, stirring actively to coagulate the precipitate, adding a little more silver nitrate and, after coagulating the precipitate, diluting with water and filtering through a small plug of absorbent cotton. The precipitate is well washed and the AgCl dissolved out by pouring ammonium hydrate through the cotton and re-precipitated by adding nitric acid to the filtrate.

Carbonic acid determination, qualitatively by effervescence on addition of a stronger acid, quantitatively by addition of a known excess of normal oxalic acid, boiling and titrating the excess of oxalic acid; the deficiency of NaOH is calculated as carbonate.

Phosphoric acid is determined in *soluble hypophosphites* by warming with HCl to decompose any carbonate that may be present, adding a few drops of $CaCl_2$, and rendering slightly alkaline with ammonia; a flocculent precipitate indicates phosphate. Carried out as stated this test is a good one; if *phosphite* is present a *decided excess* of ammonium hydrate will also cause a precipitate, but this will be crystalline. This test can be made quantitative if desirable by using an excess of $CaCl_2$ to precipitate all of the phosphoric acid, as $Ca_3(PO_4)_2$, on addition of ammonia, collecting the precipitate on a filter, washing, dissolving in HCl, adding an excess of ammoniacal solution of ammonium citrate (until the solution is alkaline and free from a precipitate) and precipitating with magnesia mixture. *Insoluble hypophosphites* are only satisfactorily tested for phosphate by preceding the above treatment by boiling with an excess of an alkaline hydrate and filtering.

Sodium and potassium recognized by flame tests; when present as impurities were estimated from the amount of unsaturated acids obtained in the analysis.

Calcium detected and estimated by white precipitate, insoluble in acetic acid, on adding ammonium oxalate; in ferric hypophosphite, after oxidation with Br, by addition of sufficient ammonium acetate to precipitate the ferric phosphate on boiling, filtering and adding ammonium oxalate.

Magnesium tested for by addition of NH_4Cl, NH_4OH and $(NH_4)_2CO_3$ boiling, filtering and adding to the filtrate $(NH_4)_2HPO_4$.

Ferric oxide determined by taking about one gram of ferric hypophosphite adding 25 cc. water, a few drops phenolphthalein and normal NaOH in the cold until a red color is imparted to the supernatant liquid; the mixture is then boiled and NaOH added, drop by drop, until the red color becomes permanent. Every cc. NaOH is the equivalent of 0·0266 gm. F_2O_3.

From the results of these various determinations was then calculated the composition of the hypophosphite.

Comparatively little work had been done on the hypophosphites before the fact was discovered that the samples did not run evenly in composition; the salt taken for analysis was afterwards always finely powdered in a warm mortar (to prevent absorption of moisture), thoroughly mixed and placed in small tightly-stoppered bottles or test-tubes, from which the small quantities required for analysis were taken, the weight being obtained by taking the difference in weight of bottle before and after taking the sample.

CALCIUM HYPOPHOSPHITE.

This salt is directly or indirectly the source of the officinal hypophosphites, as well as of the commercial acid; hence its purity is an important factor in considering the purity of its preparations. Four samples were examined:

	I.	II.	III.	IV.
$Ca(H_2PO_2)_2$	99·48 [1]	98·27	98·40	98·10
$CaSO_4$	0·55	1·30	1·53	1·59
$CaCO_3$	Merest trace.	0·35	Trace.	0·31

The insoluble portion of these samples was found to consist of carbonate only, due to the small quantity of $Ca(OH)_2$ soluble in water not having been thoroughly removed, and which, during evaporation was changed by atmospheric carbon dioxide into calcium carbonate. This is an impurity which is so easily removed that the U. S. P. is right in requiring a completely soluble salt. A little CO_2 passed through the filtrate after separating the excess of lime and calcium phosphate, boiling and filtering again is all that is required; there are two filtrations necessary in the ordinary method of preparation, so the only additional expense will be for the CO_2.

The test for *soluble phosphate* in the U. S. P., considering the presence of sulphate in all samples, might give rise to wrong conclusions; again, soluble phosphate of calcium is an *acid* salt and not likely to be found if an excess of lime was used in the preparation of the hypophosphite; granting its presence, the requirement of forming a *neutral* solution, which must not yield a precipitate on addition of ammonium hydrate to alkaline reaction, is a more appropriate and trustworthy test for phosphate.

POTASSIUM HYPOPHOSPHITE.

Made by double decomposition between calcium hypophosphite and potassium carbonate. Two specimens were examined.

	I.	II.[2]
KH_2PO_2,	73·88	98·21
H_2O,	1·89	0·49
KCl,	1·14	0·98
K_2SO_4,	trace.	0·33
K_2HPO_3,	13·34	. . .
K_2CO_3,	9·73	. . .

---

[1] Determined with $HgCl_2$ 99.48; with $K_2Mn_2O_8$ 99.56 and with Br. 99.52.

[2] Ca, a trace.

In No. 1 we have the first and only salt in which phosphite was present, and this did not yield a precipitate with acetic acid and lead acetate. 0·517 gram, after oxidation with Br, required 22·9 cc. NaOH for neutralization, to this must be added the value of 9·73 per cent. K_2CO_3, or, as NaOH, 0·73 cc., a total of 23·63 cc.; from this is subtracted the correction 0·3 cc., and the number of cc. of NaOH corresponding to the hypophosphite is 23·3, which, multiplied by 0·01735 and divided by 0·517, will give as the amount of KH_2PO_2 0·4047 gram, or 78·27 per cent. From the amount of magnesium pyrophosphate 82·66 per cent. KH_2PO_2 is calculated.

82·66 — 78·27 = 4·39 per cent. is the equivalent of K_2HPO_3, expressed as KH_2PO_2, and from which by proportion is obtained the amount of phosphite.

KH_2PO_2 :	$2K_2HPO_3$ as	the difference :	x the amount of phosphite.
104·1	316·4	4·39	13·34 per cent.

The amount of KH_2PO_2 is, 78·27 the combined reducing value minus 4·39 the reducing value of 13·34 per cent. K_2HPO_3 or, 73·88 per cent.

SODIUM HYPOPHOSPHITE.

Prepared like the potassium salt and according to the U. S. P. should have one molecule water of crystallization. Three samples were examined, with results which lead to the suggestion that greater uniformity in the commercial article might be obtained by replacing the present officinal by the anhydrous salt.

	U. S. P. Formula.	I.	II.	III.[1]
NaH_2PO_2,	83·02	85·00	89.98	98·06
H_2O,	16·98	13·70	8·44	1·06
NaCl,	. . .	0·52	0·21	0·43
Na_2SO_4,	. . .	0·71	1·19	0·31

FERRIC HYPOPHOSPHITE.

For this salt two entirely distinct processes of manufacture have been published. 1. By double decomposition of ferrous sulphate and calcium hypophosphite; the calcium sulphate formed being but sparingly soluble is removed by filtration and the filtrate, containing ferrous hypophosphite, during evaporation is stated to yield ferric hypophosphite by oxidation of the ferrous salt. Apart from the wrong impression which is received from the above statement that the hypophosphorous acid will remain unchanged while the ferrous condition is oxidized to ferric, there is another reason which it is strange to say, has never been advanced against the above process yielding the officinal product. In the change of ferrous salts into ferric there must always be added sufficient acid to satisfy the increased equivalence. When this acid is not supplied there will always be produced a basic salt (for illustrations the officinal solutions of ferric sulphate answer admirably). Assuming that, as in the above case, the oxidation is due to the oxygen of the air and does not affect the hypophosphorous acid, the change is written $2\ Fe\,(H_2PO_2)_2+O=Fe_2\ O\,(H_2PO_2)_4$ a basic salt; by the addition of the required quantity of acid there is produced, theoretically, the normal salt, $2\ Fe\,(H_2PO_2)_2+O+2\ H_3PO_2=Fe_2\,(H_2PO_2)_6+H_2O$. Further comment is hardly necessary.

---

[1] Ca, a trace.

2. By double decomposition of solution of ferric chloride or sulphate and sodium hypophosphite. This method gives the desired officinal product but is subject to some practical difficulties. The freshly precipitated salt is quite soluble in water and by washing, to remove the sodium salt, there is very little of the hypophosphite left. From the analysis of two commercial samples (I and II) the manufacturers overcome this difficulty by very little washing, consequently, these preparations contain large quantities of sodium salts, in both cases the sulphate.

An excess of the iron salt also increases the solubility, while (in making a preparation described further on) the presence of excess of hypophosphite was found to diminish it.

Ferric hypophosphite being insoluble in alcohol and both ferric chloride and calcium chloride soluble, it was thought possible to make the salt by triturating calcium hypophosphite and a slight excess of solution of ferric chloride in the presence of alcohol and thoroughly washing the product with alcohol. The alcohol was afterward recovered by distillation. This preparation (III) was of light yellow color due probably to a little oxychloride of iron which apparently was formed; although containing a higher percentage of $Fe_2\,(H_2PO_2)_6$, the product was not at all deemed satisfactory.

Freshly precipitated ferric hypophosphite is flocculent in appearance but, allowed to stand sometime before filtering, becomes crytalline and quite insoluble in water, therefore permitting a thorough washing with little loss. Taking advantage of this and allowing for the purity of commercial hypophosphite of calcium (98 per cent.) and the decreased solubility of ferric hypophosphite in presence of a slight excess of calcium hypophosphite the product (IV) of the following process was found to be a very pure salt.

Calcium hypophosphite	30 gm.
Solution of ferric chloride	49·5 gm.
Distilled water, a sufficient quantity.	

The calcium salt with 100 cc. water is placed in a flask and the iron solution gradually added, shaking after each addition. The ferric hypophosphite first forms a magma but, after a little time, separates as an agglutinated mass which must be disintegrated by brisk agitation. Agitation must be resorted to from time to time until the precipitate becomes crystalline and loses all tendency to cake, which change will require at least twenty-four hours; a better yield is probably obtained by allowing to stand two or even three days before filtering and washing. The washings are tested for Ca by addition of ammonium oxalate, and as long as a precipitate is obtained washing must be continued. It was noticed that as the washings became free from Ca they came through the filter a little cloudy and allowed to run into the vessel containing the first portions of the filtrate, after a little time, a distinct although a small precipitate was formed, due to the dissolved ferric hypophosphite being reprecipitated by the presence of a small quantity of calcium hypophosphite in the first filtrate. Using the above quantities and allowing to stand three days before filtering there was obtained a yield of 93 per cent. based upon the quantity of ferric chloride used.

	I.	II.	III.	IV.
$Fe_2 (H_2PO_2)_6$	90·32	86·19	93·30	98·80
H_2O	2·82	0·71	4·70	0·65
$Fe_2 (SO_4)_3$	3·20	5·92	——	——
$Na_2 SO_4$	3.92	7·31	——	——
Fe_2Cl_6	——	——	0·68	0·66
Fe_2O_3	——	——	0·85	——
$CaSO_4$	——	——	0·66	——

The U. S. P. tests appear to be based upon the properties of the recently precipitated salt. The solution of all of the above samples in HCl and sodium citrate solution was obtained only after considerable agitation and time. The effect of boiling acetic acid forms little claim to the title of solvent; whilst calcium salts can be tested for in the filtrate from the acetic acid treatment the insoluble residue is decidedly not what the U. S. P. states it to be—ferric phosphate. To detect phosphate in ferric hypophosphite I know of no more reliable method than that given elsewhere in this paper.

CANAIGRE.

By Henry Trimble.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 56.

The following account of a tanning material, which has several times in the past few years been mentioned as new, or as a possibility for the tanner, is undertaken with a view of relating what has been done toward developing this source, and at the same time calling attention to the fact that if we encourage home production we have in canaigre a material which gives promise of superseding the uncertain and much adulterated gambier.

Canaigre is found in large quantity in the sandy soil on both sides of the Rio Grande and northward over a large portion of Western Texas and New Mexico.

Its history is briefly as follows:—It is said to have been used in tanning by the Mexicans for over two centuries. Our first information, however, dates from July 9th, 1868, when a package of these roots was forwarded for Mr. John James, of San Antonio, Texas, to the Agricultural Department at Washington, together with a letter stating that Mr. F. Kalteyer, chemist in San Antonio, had found them to contain thirty-two per cent. of tannin. This sample was mislaid or overlooked until 1878, when it was reported on by the chemist.[1] It was then found to yield 23·45 per cent. of tannin. A fresh sample was also procured and the tannin estimated in the still fresh root with almost identical results, after making due allowance for difference in moisture. The other constituents reported at that time need not claim our attention at present further than to notice a considerable amount of starch, 18·00 per cent.

Previous to this publication by the Government, Mr. Rudolph Voelcker, of Galveston, Texas, published[2] an analysis of roots gathered in July, 1874. He found 23·16 per cent. tannin, and proved the presence of chrysophanic acid and aporetin. He was not aware of the botanical origin of the plant, but supposed it to belong to the natural order Polygonaceæ.

---

[1] Report of the Commissioner of Agriculture, 1878, p. 119.

[2] An Analysis of Raiz del Indio. American Journal of Pharmacy, 1876, p. 49.

In 1879, Mr. Wm. Saunders[1] in his report on canaigre stated it was the *Rumex hymenosepalum* of Torrey, and furnished a lithographic plate of the plant in bloom.

At the New Orleans Exposition, 1885-86, in one corner of the section devoted to products from New Mexico were some of these roots, above which was the inscription, "A new tanning material."

As will be shown later, this exhibit, insignificant as it appeared, attracted the attention of at least one person.

In 1886[2], a sample of a root sent to me from San Antonio, Texas, under the name of "Indian Root," was analyzed and the results published under the title of "Yerba del Indio," from the impression it was the Aristolochia fœtida of the Mexican Pharmacopœia. This impression, however, was corrected by Professor J. M. Maisch in the same issue, page 115. He suggested, and it has since been found to be correct, that this "Raiz del Indio" was the canaigre root. That analysis fixed the amount of tannin at 11·66 per cent., but it was found that the root, which was not analyzed as soon as received, had commenced to decay and, later, it was completely riddled by insects. In this respect my experience differed from that of the Government chemist, who found no change after ten years.

Soon after the New Orleans Exposition samples of two or three hundred pounds were sent to Chicago for experiments in a number of tanneries there. Mr. E. C. Denig of that city has devoted much time since then to studying this material, from its source in Texas and New Mexico to its application in the tanning of hides.

Canaigre consists of heavy globular and fusiform pieces from two to six inches long and one to three inches in diameter. Externally it is of a dark, reddish-brown color, becoming, by age, almost black; internally it is from a bright to a brownish-yellow according to age and amount of exposure to atmosphere. When collected the roots consist of clusters resembling sweet potatoes. They are found near the surface or sometimes on top of the ground, are rapidly dried and, at a certain stage, cut into small pieces. If allowed to get very dry they become so hard as to resist any ordinary method of cutting. From samples of the whole and clipped root, kindly furnished me by Mr. Denig, I have found 17·33 per cent. of tannin. This figure is rather lower than that obtained by other investigators, but the deficiency may be explained by my sample containing more moisture. Dr. H. E. Sturcke[1] has found a total of 28·57 per cent. tannin.

---

[1] Report of the Commissioner of Agriculture, 1879, p. 364.

[2] An Analysis of Aristolochia fœtida. AMERICAN JOURNAL OF PHARMACY, 1886, p. 113.

The ground root is at present used in a number of tanneries and has been found to more closely resemble gambier in its action than any other tannin material. An extract has also been prepared and used which contains from forty to sixty per cent. tannin, and it is thought that in this form it will probably replace gambier. Should the hopes and efforts of those who are engaged in the development of this material be realized, we will have a source of tannin which is said to be inexhaustible, and which will be the means of either bringing a better gambier into this market or of driving it entirely out of use here. It is said that the dried and ground root can be delivered in any part of the United States at a price not exceeding three cents per pound.

Thus after a delay of twenty years this root has reached that stage of practical application when a useful future may be predicted for it, and the persistent efforts of the past four years have every prospect of being rewarded.

The presence of so much starch in a tanning material is, perhaps, without precedent, and there are good reasons why this is no disadvantage. The properties of the pure tannin have not been investigated, and it is not known whether canaigre red or gallic acid is the product of its decomposition. Crystals have been obtained by agitating an aqueous extract of the root with ether, which do not resemble either gallic acid or catechin.

This crystalline compound and the pure tannin are under investigation by me at the present time.

Phenylpropionic Acid, $C_9H_{10}O_2$.—Dr. C. T. Williams (Practitioner), has found it useful in the treatment of phthisical patients. The acid is insoluble in water, but dissolves in six parts of alcohol. From ten to twenty minims of this saturated solution, diluted with from one to two ounces of water, were given three times a day.

---

[1] *Shoe and Leather Reporter*, Oct. 27th, 1887, p. 862.

THE OILS OF WINTERGREEN AND BIRCH.

By Henry Trimble and Hermann J. M. Schroeter.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 57.

The history of these two oils has recently been written by Dr. E. R. Squibb[1] and the papers there referred to from the first in 1842 by Professor Procter to the last in 1884, by Mr. H. P. Pettigrew, can all be found in the American Journal of Pharmacy.

From a perusal of the papers by these two authors and that of Cahours[2] one finds that the oils are similar in physical properties, that they are largely composed of methyl salicylate, that one of them, oil of wintergreen, contains approximately 10 per cent. of a terpene according to Cahours, but only 0.3 per cent. according to Pettigrew, and according to the latter that the oil of birch is composed of methyl salicylate only, but according to Procter that the two oils are identical. On account of the variance of these authorities, and recent statements about the "Artificial Oil of Wintergreen," we have been led to investigate anew the chemical composition of the oils and in that way compare them. It is the exception when a product, as simple as oil of birch is described by Pettigrew to be, is produced in nature; such substances are more frequently found to be made up of a series of compounds. With this principle clearly in view, we procured four samples, two of each oil.

Sample I, wintergreen oil, was obtained through the kindness of Mr. C. M. Driggs, of White Haven, Penna., whose acquaintance with the distillers of that district enabled him to vouch for the genuineness of a sample of each.

Sample II, oil of birch, from the same source.

Sample III, oil of wintergreen, from Mr. Underhill, of New Hampshire.

Sample IV, oil of birch, this and sample III had been a number of years in the collection of Prof. J. M. Maisch, and were kindly given by him for this investigation. At least one of them, the wintergreen, was examined by Mr. Pettigrew.

Physical Properties.—The following tabular statement of the specific gravities and boiling points shows a remarkable similarity among the samples in this respect.

---

[1] Ephemeris, October 1887, p. 951.

[2] *Ann. Chim. et Physique*, [3] x, p. 327.

Sample.	Boiling Point, C.	Specific Gravity at 15° C.
I. Wintergreen	216°	1·1838
II. Birch	217°	1·1840
III. Wintergreen	216°	1·1845
IV. Birch	217°	1·1840

Since these data have shown considerable variation at the hands of different investigators, we used every precaution to arrive at correct results, and from them one cannot but conclude that these figures could be of no practical value in distinguishing the oils.

Chemical Composition.—Two methods of saponifying these oils have been proposed, one by boiling for some hours with excess of concentrated potassium hydrate solution, which will be designated the *hot process*, and the other, proposed by Professor J. U. Lloyd,[1] by pouring the oil, slowly, with constant stirring, into a concentrated solution of potassium hydrate heated to 82° C.

It was noticed by Procter that when the oil of wintergreen was dissolved in potassium hydrate solution in the cold it formed a solid mass, from which the oil separated unchanged on the addition of hydrochloric acid. We found no separation of the oil after heating to 82° C. as directed by Lloyd, although several trials were made with both methods, and we finally adopted a modification of Lloyd's formula, using about one-half the potassium hydrate recommended in it, attaching the flask to an upright condenser and heating on a water-bath for one-half hour.

By this method we saponified about 800 grams of each oil. Both oils after saponification possessed a characteristic fragrant odor, entirely distinct from that of the oil. The clear solutions were agitated with purified petroleum ether, b. p. 25° to 45° C., and the process repeated with three portions on each. The aqueous solutions, after final separation from the petroleum ether, were almost free from odor, and were set aside for treatment with acid.

THE HYDROCARBONS.

The different portions of petroleum ether were mixed, keeping those from the two oils separate, the solvent in part recovered by distillation, and the residues set aside to evaporate spontaneously. When the solutions had been reduced to a small bulk, they were transferred to small tared bottles, and, with stoppers removed, were heated for some hours in a water-bath to constant weight.

---

[1] U. S. Dispensatory, 16th edition, p. 100.

The yield was { from oil of wintergreen, 0·3 per cent.
" " birch, 0·447 "

Another portion of each oil was saponified by the *hot process*, in which the flasks containing the mixtures were attached to upright condensers and heated for several hours on sand-baths. The saponified oils were then distilled as long as oily drops separated from the distillates, and each of these distillates agitated with ether. The ethereal solutions were treated as the above petroleum ether extractions and the yield found to be { from oil of wintergreen, 0·22 per cent.
" " birch, 0·084 "

These residues, with those from the petroleum ether, correspond to the hydrocarbon noticed by Cahours in oil of wintergreen, and named by him *gaultherilene.*

The products from the two oils were similar in odor. They both solidified on standing for a day or two, or at once on cooling. That from wintergreen commenced to melt at 10°C. and was clear at 15°C., but the hydrocarbon from birch did not commence to melt below 18°C. and was clear at a few degrees above that temperature. The variation in yield may now be accounted for by supposing that the hydrocarbon in oil of birch exists in greater quantity, as shown by our method of extracting it, but in the *hot process*, in which distillation was used in the separation of the hydrocarbon, a part of that from the birch, probably not being so volatile, was left behind in the distillation.

Even with the comparatively large amounts of oils used the quantities of the hydrocarbons were necessarily limited, therefore they were reserved for a determination of their chemical composition, rather than risk the liability of loss in determining the specific gravity and boiling point.

It may be said, however, that both were lighter than water, and had boiling points near 200°C. No residues remained on the further ap plication of heat. Portions of each were dissolved in alcohol and the absence of traces of salicylic acid determined by ferric chloride.

Composition.—The hydrocarbon obtained by our method from oil of wintergreen, Sample I., was submitted to combustion with the following results:

0·0981 gram substance gave 0·3122 CO_2 and 0·1048 H_2O.

	Found.	Calculated for $C_{15}H_{24}$.
C,	86·79 per cent.	88·23 per cent.
H,	11·87 "	11·77 "
	98·66	100·00

Vapor Density.—0·090 gram substance displaced 11·6 cc. air.

Found 6·73

Calculated for $C_{15}H_{24}$ 7·07

The combustion was repeated with a larger amount of substance, with almost identical results, and another determination of the vapor density of a sample from the same oil by the *hot process* gave 6·90.

The hydrocarbon from oil of birch, sample II, gave the following results on combustion. 0·1142 gram substance gave 0·366 CO_2 and 0·1201 H_2O.

C,	87·41 per cent.
H,	11·69 "
	99·10

Vapor Density.—0·1121 gram substance displaced 14 cc. air.

Found 6·95

Calculated for $C_{15}H_{24}$ 7·07

Some of these determinations were duplicated without perceptible variation from the above.

The results point to the existence of gaultherilene in both oils, and that it is a sesquiterpene of the formula $C_{15}H_{24}$. The only doubt we feel, in concluding this, is the possibility of the vapor density being a coincidence, since the hydrocarbon may be composed of two or even more compounds, because it appears to be made up of a solid and a liquid portion.

THE ACIDS.

We next directed our attention to the alkaline solutions which were set aside for treatment with acid, and submitted them separately to the following treatment.

On the addition of chemically pure hydrochloric acid in slight excess, salicylic acid separated. This precipitate was collected on a muslin strainer, washed with a little cold water, pressed, washed, pressed again and recrystallized from boiling water. The washings were concentrated, the acid as far as possible recovered, purified, mixed with the pressed lot and the whole dried at 60° C.

The dry mass was pulverized to reduce its bulk and then macerated successively with three portions of petroleum ether. The latter was partly recovered by distillation and the residue allowed to stand and become cool, when a crop of crystals of salicylic acid separated. After removing these the liquid was allowed to evaporate spontaneously; the crystalline residue from the evaporation, although small in amount, was purified by crystallizing several times from boiling water and petroleum ether, when the crystals became pearly in character, and gave the odor of benzoic acid when dissolved in boiling water. On the addition of ferric chloride solution only faint evidence of salicylic acid was obtained. The crystals from oil of wintergreen by this process melted at 125° C., and those similarly obtained from oil of birch melted at 124° C. It may be recalled that benzoic acid melts at 121·4° C.

The crystals from oil of wintergreen yielded the following results on combustion:

0·0712 gram substance gave 0·1771 CO_2 and 0·0311 H_2O.

	Found.	Calculated for Benzoic Acid.	Calculated for Salicylic Acid.
C,	67·84 per cent.	68·85 per cent.	60·87 per cent.
H,	4·85 "	4·92 "	4·34 "
O,	27·31 "	26·23 "	34·79 "
	100·00	100·00	100·00

Vapor Density.—0·0671 gram substance displaced 13·3 cc. air.

Found 4·36
Calculated for Benzoic Acid 4·23
" " Salicylic Acid 4·78

The crystals similarly obtained from oil of birch gave on combustion the following results:

0·0812 gram substance gave 0·2035 CO_2 and 0·035 H_2O.

C, 68·35 per cent.
H, 4·79 "
O, 26·86 "

100·00

Vapor Density.—0·0811 gram substance displaced 16·3 cc. air.
Found 4·30
Calculated for Benzoic Acid 4·23

THE ALCOHOLS.

The original liquid after separation of salicylic acid was repeatedly distilled and the first portion saved each time in order to recover the alcohol. This was finally macerated with and distilled from four lots of calcium oxide.

The alcohol from wintergreen had the sp. gr. 0·801 and boiled at 67° to 73° C. The alcohol from birch had the sp. gr. 0·8017 and boiled at 67° to 73° C. When submitted to the iodoform test, both quickly gave the characteristic odor, and, after standing, deposited yellow crystals of iodoform, indicating the presence of small quantities of ethyl alcohol.

ARTIFICIAL OIL OF WINTERGREEN.

This preparation has been manufactured and offered for sale by a few firms in recent years. So long as it is sold for what it really is, no objection can be attached to the sale of it. But the temptation to replace the true oils by the artificial product will grow stronger as the price of the latter becomes lower, and no doubt it is used to mix with them at the present time.

In view of the fact that the oil of birch has in part displaced that of wintergreen, Dr. Squibb[1] nearly two years ago made some remarks about the similarity of the three, suggesting that oil of birch should be called by its correct name, and that the Pharmacopœia by its present definition is lending its authority to perpetuate the error. These statements have since called forth from others the recommendation that the artificial oil should be made officinal at the next revision of the Pharmacopœia. How far this would be undesirable may appear on examining the following analysis of a representative sample of the commercial artificial product, and reflecting on the present difference between this and either of the natural oils, and the still greater difference that would naturally follow the recommendation of the artificial methyl salicylate by the Pharmacopœia. If it is not a pure compound now, when it is competing for recognition, what would it degenerate to if it should become established by the recommendation of the Pharmacopœia?

---

[1] Ephemeris, October, 1887, p. 954.

The sample examined by us had a boiling point of 217° C., and a specific gravity of 1·1833 at 15° C. Immediately on the addition of potassium hydrate the characteristic wintergreen odor disappeared, and a disagreeable phenol-like odor was noticed. Petroleum ether removed nothing from this alkaline solution. On adding chemically pure hydrochloric acid a very bulky precipitate separated. This was collected, pressed, purified and dried as in the case of the acids from the oils, when it was found to be about four times as bulky as they. In weight, however, it was the same. Its melting point was 150° C. Pure salicylic acid melts at 156° C. The powdered acid was heated with petroleum ether and the solution, after removing the first crop of crystals, was allowed to evaporate spontaneously.

The residue from this evaporation was much larger than that obtained from the oils, and, after purification was found to melt at 122° C. or only six-tenths of a degree above benzoic acid. The crystals gave off the characteristic odor of benzoic acid when warmed and when dissolved in hot water, and otherwise corresponded with that acid.

0·1012 gram substance gave 0·2548 CO_2 and 0·0443 H_2O.

	Found.		Calculated for Benzoic Acid.	
C,	68·67	per cent.	68·85	per cent.
H,	4·87	"	4·92	"
O,	26·46	"	26·23	"
	100·00		100·00	

Vapor Density.—0·062 gram substance displaced 12·5 cc. air.

Found 4·29

Calculated for Benzoic Acid 4·23

Both the combustion and the vapor density determination were repeated without important variation. We made no exact determination of the proportion of benzoic acid present, but it was not far from 15 per cent. of the total acid precipitated. In the acid precipitated from the oils it was not more than 1 per cent. Great loss necessarily occurred in the process of purification.

SUMMARY.

I. Previous investigators have found oil of wintergreen to consist of methyl salicylate and a hydrocarbon, called gaultherilene; and oil of birch to be composed of methyl salicylate alone.

II. We find in addition to methyl salicylate, in both a hydrocarbon of the formula $C_{15}H_{24}$, and small quantities of benzoic acid and ethyl alcohol. The amount of the hydrocarbon is from 0·3 to 0·447 per cent., and it becomes solid on standing a short time or on cooling. It is probably made up of a solid and a liquid portion.

III. The oils are physically and chemically identical. The only difference detected being in the melting point of the hydrocarbons. That from wintergreen melted at from 10° to 15°C., and that from birch at 18°C. This may depend on the time of collecting the plants or on the age of the oils.

IV. A representative sample of artificial oil of wintergreen possessed the physical properties, but not the chemical composition of the natural oils, nor was it pure methyl salicylate.

V. The artificial product, when unmixed with the natural oils, may be identified by the addition of excess of potassium hydrate, when all odor of wintergreen will disappear.

VI. It would be undesirable, in the next Pharmacopœia to replace the almost pure natural oils by an impure methyl salicylate of variable and uncertain composition. No reasonable objection can be offered to the designation by the Pharmacopœia, as oil of wintergreen, the product from either of the natural sources.

FABIANA IMBRICATA.

By George A. Deitz, Jr., Ph. G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 58.

Pichi, as this drug is commonly called, was introduced into the United States a few years ago by Parke, Davis & Co., of Detroit. It belongs to the natural order Solanaceæ, sub-order Curvembria, and to the tribe Nicotianeæ. Its habitat is South America, principally Chili. It is said to be especially useful in diseases of the urinary organs, acting as a diuretic as well as a solvent for calcareous deposits.

A full description will be found in the American Journal of Pharmacy, February, 1886, together with a proximate analysis by Dr. A. B. Lyons. The following results do not in all respects agree with those of Dr. Lyons, which may in part be accounted for by my using a sample of the woody portion and bark ground together, which reduced the percentages of extract obtained by the various solvents. It may be here explained that the part used for analysis was the woody branches, it being claimed that both wood and bark possess medicinal virtues, although it is probable that the latter is the more active of the two.

Petroleum ether dissolved 1·15 per cent. of the drug, which consisted of a trace of volatile oil, a fat melting at 40° C., a wax melting at 45° C., and a caoutchouc-like body soluble in chloroform, insoluble in the other usual solvents and melting at 65° C. No odor of burning rubber, however, was developed when the petroleum ether extract or any of its constituents were ignited, as noticed by Dr. Lyons.

Stronger ether extracted 1·41 per cent. of the drug, and from this ethereal extract warm distilled water dissolved a small percentage of a fluorescent glucoside, which fluorescence was much intensified on the addition of dilute sodium hydrate solution. On agitating this aqueous solution with ether the glucoside was absorbed by the latter solvent, which deposited it in stellate groups of crystals. These crystals were soluble in water, alcohol, chloroform and ether. With concentrated sulphuric acid and potassium bichromate a dark-green color was developed, with nitric or hydrochloric acid a yellow color with some fluorescence, and with potassium or ammonium hydrate a deep yellow with bluish fluorescence.

That portion of the ethereal extract insoluble in water was soluble in absolute alcohol which solution on concentrating and setting aside deposited crystals. These on re-solution and treatment with animal charcoal were obtained of a pure white color. They were entirely insoluble in water, but soluble in boiling 95 per cent. alcohol, absolute alcohol, chloroform and ether. They gave a dark-blue color with sulphuric acid and potassium bichromate, but they were insoluble in and unaffected by concentrated solutions of the alkaline hydrates. They did not melt, but became brown from decomposition at 270° C., the highest temperature to which they were subjected.

Absolute alcohol extracted 1·13 per cent., which was found to consist of an additional quantity of the fluorescent glucoside and resin, but no tannin. The remainder of the drug was found to contain 2·13 per cent. mucilage, 2·04 per cent. albumen and a number of the usual constituents, but only traces of sugar and no starch.

The amount of moisture in the original drug was 7·75 per cent. and the ash 10 per cent.

Finally it may be noticed that no trace of alkaloid was found, although Dr. Lyons thought he detected a small quantity.

Recently an analysis has been made by MM. Niviere and Liotard,[1] who found the fluorescent glucoside, but failed to notice the neutral crystalline compound in the ethereal extract as above described, or to detect any trace of alkaloid. For additional investigation of this neutral principle see the following paper.

ON A CRYSTALLINE COMPOUND IN FABIANA IMBRICATA.

By Henry Trimble and Hermann J. M. Schroeter.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 59.

Both the glucoside and the crystalline compound, rich in carbon, mentioned in the preceding paper, are worthy of further investigation. The present contribution details our results on the latter compound. In this work we were greatly aided by Messrs. Parke, Davis and Co. of Detroit, who sent us a sediment which had separated from 300 pounds of the fluid extract of pichi. This sediment appeared to be largely made up of this compound mixed with woody fibre.

A quantity was dried at 70°C., the residue powdered and macerated with petroleum ether. This solvent removed a small quantity of a wax-like substance. The residue was then extracted with successive portions of stronger ether, which dissolved a large proportion of it. The several ethereal extractions were kept separate, as it was thought there might be more than one compound present and they might be partly separated by this means.

The different lots were purified by recovering the ether, dissolving the residue in hot 95 per cent. alcohol, decolorizing with animal charcoal and recrystallizing from hot alcohol, until pure white, somewhat silky, acicular crystals were obtained. In physical properties the different portions appeared identical. The crystals turned brown at 240° C. and commenced to decompose without melting at 270° C.

A combustion gave the following results. 0·1939 gram substance gave 0·5515 CO_2 and 0·190 H_2O. corresponding to

C,	77·57	per cent.
H,	10·89	"
O,	11·54	"
	100·00	

---

[1] *Jour. de Pharm. et de Chimie*, xvi, p. 389.

Five more combustions were made on the different portions, one being a lot of larger crystals that separated on long standing from a weaker solution. The results were almost identical with the above figures, thus proving the original substance to contain but one crystalline compound. The mean of the six analyses was found to be as follows:—

C,	77·47	per cent.
H,	10·93	"
O,	11·60	"
	100·00	

No loss occurred on heating the crystals to 110° indicating the absence of water. The compound is apparently a resin of the formula $(C_{18}H_{31}O_2)_x$, and without medicinal value.

It occurs to us that it may be a decomposition product of the fluorescent glucoside in the drug.

POISONOUS PLANTS AND THE SYMPTOMS THEY PRODUCE.[1]

By F. W. Anderson.

When horses, cattle or sheep in Montana, die from unknown causes, which have produced more or less marked cerebral disturbance within a few days or hours before dissolution, accompanied by one or more minor symptoms, they are said to have been "locoed," that is poisoned by some usually mysterious unknown plant. The general symptoms are here given in the order they usually appear:

The animal wanders alone, has unnaturally bright eyes and slight frothing at the mouth or even extreme salivation occurs and the creature goes about with a stream of clear saliva trickling from its chin to the ground, or else the lips are dry, a little swollen and the whole mouth very hot. The appetite becomes notably impaired; large quantities of offensive gas are belched forth frequently accompanied by a greenish froth mixed with finely chewed food. The brain now becomes plainly affected, control of limbs partially or wholly lost—sometimes muscles of one side of the neck are contracted in a pitiable manner. In a few days, hours or minutes as the case may be, after proper limb-control is lost, the staggering animal refuses to eat or drink at all, becomes stupid, reels and falls, seldom rising again. Stupor increases, eyes become dull and staring, perfect stupor comes on. Limbs and neck may become quite rigid and extended, or else in natural position and easily moved by the hand. Abdomen usually swells to enormous size. Victim may lie in this condition a week or death may come in a few hours, there is rarely any struggle at that time.

---

[1] From the *Botanical Gazette*; condensed by G. M. Beringer.

Post-mortem examination.—The intestines with their surrounding fat are already green, although the creature may have just died. The arteries and smaller vessels in the limbs are gorged with thick, black blood. The lining of the first stomach is worn and ulcerated in patches and in some cases seems to have commenced decomposition, is very soft and can be peeled off the muscular layer with thumb and forefinger in big pieces. Lungs and heart almost bloodless, but the brain, particularly the cerebellum, is purplish, soft and pulpy.

The symptoms vary considerably and it seems unlikely that one poison causes them all. Four common plants are here said to "loco" stock, viz: Oxytropis Lamberti, Leucocrinum montanum, Fritillaria pudica and Zygadenus elegans. The first is now known to produce no evil effects except when eaten in large quantities for days together. Leucocrinum montanum is said to be very fatal to sheep after the fruit has developed. It grows close in the grass and its narrow grass-like leaves are not easily avoided by stock. Fritillaria pudica is almost the first plant to flower in spring. Before the grass is green horses and sheep often nip off the leaves. The scaly bulb is somewhat acrid to the taste. Zygadenus elegans does not flower so early, but sends up its long grassy leaves at the same time. Sheep eat much of this plant, even nipping off the panicles when they appear. The whole plant is acrid, but the deep-set bulb is strongly so.

NOTE BY ABSTRACTOR.—F. D. Kelsey writing from Montana to the same journal (*Botanical Gazette*, 1889, 20) states that he had recently received specimens of a root and plant from a ranchman, with the declaration that "it was a 'loco' weed and that it was killing horses." The specimen proved to be Oxytropis lagopus, *Nutt.*

The writer of the above article, it will be observed, does not mention any plants of the genus Astragalus, although several species, notably the A. mollissimus, *Torr.*, have been credited with this peculiar toxic action. In fact, the latter plant and the nearly related Oxytropis

Lamberti, *Pursh*, were those to which were originally assigned the name and poisonous properties of loco weeds.

The author adds three new species Leucocrinum, Fritillaria and Zygadenus to the list of loco weeds. We are not surprised that these three liliaceous plants, the last-named being botanically closely related to Veratrum, should have a poisonous action when eaten by cattle, and it seems not unlikely that the eating of these plants by cattle in other localities may have escaped notice. It seems not improbable that this action has been erroneously credited to the milder leguminous plants.

The poisonous character of the plants of the genus Zygadenus has long been recognized. J. U. and C. G. Lloyd, some two years ago, called attention to the extremely poisonous character of Zygadenus Nuttallii, *Gray*[1], stating "that specimens of the plant had been received from Dr. H. S. Goodell who had met with several cases of accidental poisoning therefrom." The Doctor wrote: "I find it to be a powerful narcotic poison. One of my patients, a girl 9 years old, claimed that she only broke a stem of the plant and rubbed the juice over her lips and lapped it off with her tongue. Severe convulsions followed, lasting one and a half hours, the most violent it has been my lot to witness in a practice of 35 years. Twenty-four hours later she had one of an hour's duration." Messrs. Lloyd then stated that "the plant is now being physiologically investigated by Prof. Roberts Bartholow and its constituents are being investigated by us." We believe that no report has yet been published.

In 1879 Sereno Watson, in reviewing "Our North American Liliaceæ," distinguished a new species in what had been classed as Z. Nuttallii, *Gray*. The new species he named Zygadenus venenosus, *Watson*, the specific name signifying its poisonous characters.

In the "Botany of California" the same writer states of this plant: "The bulb is poisonous and is known among the Northern tribes of Indians as 'Death Camass.' Dr. Bolander states, however, that in Sonoma county it is eagerly eaten by hogs and that hence it is called 'Hog's Potatoes' by the farmers." G. M. B.

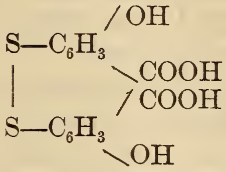
Salol is reported by Dr. W. P. Nicholson, of Atlanta, Ga., to have given him very satisfactory results in dysentery and in diarrhœa accompanying typhoid fever; it was used in five-grain doses.—*Virg. Med. Monthly.*

---

[1] *Amer. Druggist*, Aug., 1889.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph.G.

Dithio-salicylic acid  is a proposed substitute for salicylic acid; it is made by heating equal molecules of chloride of sulphur and salicylic acid to 120–150° C, dissolving the light-yellow fusion in sodium hydrate and precipitating the acid by addition of HCl as a resinous straw-colored mass forming, after pulverization, a light-yellow powder, easily soluble in alcohol, benzol and glacial acetic acid.—*Oesterr. Ztschr. f. Phar.*, 1889, 298.

Sodium dithio-salicylate is more potent than sodium salicylate, is used in smaller doses and does not produce objectionable symptoms, as disarrangement of the stomach, possibly in consequence of its insolubility. It is used as an antipyretic, antiseptic and disinfectant. *Apoth. Ztg.*, 1889, 679.

Teeth-cleanser for discolored teeth. Make a stiff paste of powdered cuttle-fish bone with a four per cent. solution of hydrogen peroxide; apply by rubbing over the teeth and after a few minutes rinse with plenty water. The teeth are cleansed in a few minutes without injury to the enamel.—*Oesterr. Zeitschr. f. Pharm.*, 1889, 304.

Artificial cloves have been met with in Austria, composed chiefly of wheat flour and ground oak bark, to which, made into a doughy mass, is added a small quantity of ground cloves and then pressed in suitable moulds. The regularity of this artificial product is all-sufficient to detect them if not admixed with genuine cloves; in this case they may be found only on close inspection, but the ridges due to the mould and a yellowish-brown powder found near the ridges will be abundant evidence.—Dr. T. F. Hanausek, *Ztschr. f. Nahrungsm. Unters.*, 1889, 121.

Salol pills are recommended by J. Past to be made by triturating six grams salol with two grams yellow wax until a soft mass is formed which is then stiffened by addition of powdered althæa and magnesia.—*Pharm. Ztg.*, 1889, 384.

Iodine-phenol is prescribed by Rothe as a remedy for whooping-cough as follows: Acid. carbol., spir. vini, aa 1·0; tinct. iodi, gtt. x;

tinct. belladon., 2·0; aq. menth. pip., 50·0; syr. opiat, 10·0. Children from two to twelve years old receive a teaspoonful every two hours, the treatment being continued for one week. This medicine, like antipyrine, shortens the attacks.—(*Wr. Med. Klin. Wochenschr.*)—*Oesterr. Zeitschr. f. Pharm.*, 1889, 285.

A new optical glass, recently introduced in Sweden, is used for making perfectly achromatic lenses having a magnifying power at least 500 diameters greater than those in present use. The glass is made by introducing small quantities of phosphates and borates..—*Apoth. Ztg.*, 1889, 651.

Constituents of some Volatile Oils.—*Oil of Laurel-leaves* is lævogyre and has sp. gr. 0·924 at 20° C. Only the fractions boiling below 180° were examined and found to be composed of a little *pinene* with considerable *cineol.* The portion boiling above 180° had a decided odor of *anethol.*

Oil of Laurel-berries.—About 50 per cent. boils below 180° and consists of a little *pinene* and much *cineol.* The hydrocarbon *laurene* of Brühl was not found, the peculiar reactions of which described by him were due to admixture of cineol.

Oil of Olibanum.—The crude oil is slightly lævogyre; sp. gr. 0·872 at 20°. Two fractions were obtained by rectification, both lævogyre: I. Boiling-point 157—160°, sp. gr. 0·870 at 20°; II. Boiling-point 160—165°, sp. gr. 0·860 at 20°. *Pinene* was found and its identity with *olibene* established. By treatment with bromine, a fraction, boiling at 177—179°, gave a considerable quantity of dipentene tetrabromide, proving the presence of *dipentene* in this oil.

Oil of Elemi is dextrogyre, has sp. gr. 0·900. The fractions below 175° contain *dextro-phellandrene,* a hydrocarbon also found in the oils of bitter fennel and Phellandrium aquaticum. *Dipentene* is present and, in addition, polyterpenes and oxygenated products. In the rectification small crystals were repeatedly observed which were assumed to be *amyrin.*

Oil of Sage: Dextrogyre, sp. gr. 0·917 at 20°; the first fractions contain *pinene* and *cineol;* the greater portion boils at 201—204°, is called *salviol* and will be further studied.

Oil of Mace.—Considerable distils at the temperature of 165°; the distillate has sp. gr. 0·854 at 20° and is composed chiefly of *pinene,* although slightly lævogyre. The crude oil, as also the higher boiling fractions, are strongly dextro-rotary, and further investigation will be made to ascertain the nature of the dextro-rotary constituent. Dipentene was observed in the fraction boiling between 175° and 180°.—O. Wallach (*Liebig's Ann.*), *Apoth. Ztg.*, 1889, 690.

Polydissolvant or sulpholeinic acid is prepared by action of sulphuric acid upon vegetable oils and made neutral in reaction by repeatedly washing with salt solution and with ether. It combines with a great number of substances which then are completely soluble in water or form emulsions with water as ether, chloroform, benzin, oil of turpentine, etc.; by warming or boiling with this acid, sulphur, iodoform, camphor, naphthalin and various coloring principles are dissolved. These solutions are quite penetrating and are easily absorbed by the skin making this vehicle superior to vaselin, oleic acid, glycerin and similar substances for external use.—*Apoth. Ztg.*, 1889, 690.

Mineral oil in fixed oils is tested for by Dr. Holde, by taking a piece of potassium hydrate of the size of a pea and boiling in a test tube with 5 cc. alcohol until solution is effected, adding 3 or 4 drops of the oil to be tested, boiling for a minute and adding from 3 to 4 cc. water; if as little as one per cent. mineral oil is present a distinct turbidity is produced, larger quantities cause the turbidity to take place after the addition of only a few drops of water.—*Apoth. Ztg.*, 1889, 751.

Oil of Bay, studied by Otto Mittmann, contains the following constituents: 1, *Pinene*; 2, possibly *dipentene*; 3, a polyterpene, probably *diterpene* (insoluble in alcohol); these three in small quantity only; 4, *eugenol*, the chief constituent, and 5, *methyl eugenol* in smaller quantity.—*Arch. der Pharm.*, 1889, 529.

Senega root, test for identification and age. This test is based upon the fresh root containing a small quantity of methyl salicylate, which by long keeping volatilizes. 5 gm. of the air-dried root, cut into small pieces, are macerated with agitation, with 30 gm. ether for one-half to one hour; the ethereal solution is filtered into a small beaker which contains about 20 cc. water at 40-50° C.; after the evaporation of the ether, hastened by slight warming, an oleo-resinous mass will float upon the surface of the water, while the salicylic acid will be in solution; without previous filtration, one dop of a ferric chloride solution is added which should produce at once a deep violet color.—Ludwig Reuter, *Arch. der Pharm.*, 1889, 549.

Fowler's solution.—G. Kassner has, in the course of some investigations, noticed that an alkaline solution of arsenous acid tested, by volumetric solution of iodine, from time to time, showed deterioration; this he accounted for by assuming atmospheric oxidation (change of arsenite into arsenate) and by experiment proved that the full amount of arsenic was present but for the above method of estimation required previous reduction of the arsenate to arsenite by use of sulphurous acid. A carefully titrated one per cent. solution kept for eight weeks indicated 0·96 per cent. but by previous reduction with sulphurous acid the full per centage was again found. Kassner thinks this oxidation accelerated by an excess of alkali.—*Pharm. Ztg.*, 1889, 549.

Improved Test for Arsenic.—Increased delicacy of Gutzeit's test (AMER. JOUR. OF PHAR., 1889, 133) is obtained by E. Ritsert through the use of filtering paper moistened with an *ammoniacal solution of silver nitrate;* 0·0005 mgm. As_2O_3 still gives a light brown, while 0·001 mgm. As_2O_3 will cause a decided black stain. By using parchment paper instead of filtering paper metallic mirrors are obtainable. Besides greater delicacy this modification has the advantage that ammoniacal silver nitrate is not so easily decomposed by paper.—*Pharm. Ztg.*, 1889, 368.

Oil of lycopodium has been examined by A. Bukowsky who, receiving results differing materially from those gotten by A. Langer (AMER. JOUR. OF PHAR., 1888, 455), attributes this to the latter working with some very old lycopodium in which the oil had become rancid. Personally gathered spores were extracted, after trituration, with ether; the yield was 48·50 per cent. of an odorless oil resembling almond oil in color and consistency; sp. gr. 0·925 at 18°; does not solidify at —22°; is optically inactive; is non-drying; easily soluble in ether, *glacial acetic acid, petroleum ether,* chloroform, oil of turpentine, benzol and hot alcohol, difficultly soluble in cold alcohol and in amyl alcohol. Contains the following constituents in approximate quantities: *Phytosterin,* $C_{25}H_{42}O$, 0·3 per cent.; *lycopodic acid,* $C_{18}H_{36}O_4$, 2 per cent., this acid is isomeric but not identical with dioxystearic acid, melts at 90—92° C., solidifies at 87—84°, forms a lead salt insoluble in ether but rendered soluble by the presence of oleate of lead; *oleic acid,* 80 per cent.; *arachidic, stearic and palmitic acids,* 3 per cent.; glycerin, 8·2 per cent.—*Pharm. Ztschr. f. Russl.*, 1889, 359.

Ferrum dialysatum is obtained by dialysis of such dilution that it requires concentration to be of use in medicine; Hager concentrates by evaporation at a temperature not exceeding 60° to prevent the coagulation of ferric hydrate. Kranzfeld attempted to make this preparation by using very concentrated solutions of ferric chloride and ammonia, but here also the finished product was too dilute. Working during the cold weather, the idea of concentrating the solution by freezing suggested itself and was practically carried out by exposing the weak dialyzed preparation over night in funnels closed with corks or rubber tubing with clamp. The next morning the fluid portion was allowed to drain off from the ice and the process repeated until of the desired strength. It was noticed that every freezing raised the amount of ferric hydrate one per cent. A 5 per cent. solution should have the sp. gr. 1·046.—*Pharm. Ztschr. f. Russl.*, 1889, 373.

Collodium can be obtained perfectly transparent if it be agitated with carefully washed and ignited quarz sand; the effect is purely mechanical, the suspended particles with the sand forming a heavy gelatinous mass from which the clear collodium is easily decanted.—Kranzfeld, *Pharm. Ztschr. f. Russl.*, 1889, 392.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

A NEW TOPICAL PREPARATION OF IODINE.—M. Eymonnet uses paper free from size which he saturates with iodide of potassium, and another paper similarly treated with iodate of potassium and tartaric acid. These papers, separated by a very thin sheet of plain paper, are then brought together with gutta-percha fasteners and enclosed in a thin sheet of gutta-percha. Plasters thus made will keep indefinitely and the iodine does not appear until the paper is immersed in water. On application, iodine is disengaged from the paper during about forty-five minutes. The amount disengaged is about thirty cgm. for each leaf. The author states that an application of these leaves for forty or fifty minutes produces better effects than can be had by five or six hours application of iodized cotton, or five or six paintings with the tincture. The plasters do not burn the skin and are tolerated for from half an hour to an hour. When necessary they may be covered with gutta-percha, and the clothing thus be protected.—*Bull. du Synd. de la Côte–d'Or; L'Union Phar.*, June.

CONCERNING SOME NEW PLASTERS.—M. Cavailles writes (*J. de Ph. et Ch.; L'Union Phar.*, May 15): Plasters containing anthrarobin, chrysarobin and pyrogallic acid cannot well be made with a basis of lead. He obtains good preparations with oleate of alumina for such plasters as are not intended to irritate, as, for instance, those of oxide of zinc, boracic acid, etc. For salicylic acid, creasote, pyrogallic acid, chrysarobin, anthrarobin, etc., a solution of caoutchouc in benzol is used. For example: Lanolin, 60 gm.; benzinic solution of caoutchouc, 30 gm.; anthrarobin, 10 gm. Pulverize the anthrarobin well and incorporate it with the lanolin; melt with gentle heat, add the benzinic solution and agitate until complete evaporation of the benzol. The formula is suitable for other plasters.

TO DISSOLVE NAPHTHOL.—For concentrated solutions, or topical mixtures, alcohol is used. For washes or gargles the above may be mixed with honey fully liquified by heat. These, if the honey is free from water, remain limpid for two or three days. Diluted solutions are not so easily made, for, apart from alcohol, only alkalies or alkaline salts can be used, and these, combining with the naphthol, produce comparatively weak antiseptic solutions. The benzoate of soda is useless here. The alcoholic solution may, for some purposes, be diluted with soap and water; but the best method seems to be to first dissolve the naphthol in camphorated alcohol. Camphor liquifies dry naphthol, and it retains the property to some degree in mixtures of water with camphorated alcohol. But, although naphthol in camphorated alcohol mixes more easily with water than does the pure alcoholic preparation, it does not form, strictly speaking, a solution.—*Répert. de Phar.*, June 10.

ENEMATA OF HYPNONE, CHLORAL AND SULPHONAL.—M. P. Vigier recommends a formula as follows: Hypnone, 10 to 20 drops; powdered gum, 3 gm.; oil of sweet almonds, 5 gm.; water, 150 gm.; for one enema. Mix the oil and gum in a mortar, add the water, and introduce the hypnone a little at a time while beating. Emulsion is perfectly effected in five minutes. The hypnone may be replaced by 1 or 2 gm. of chloral or of sulphonal.—*L' Union Phar.*, May.

URAL—This new hypnotic is obtained by dissolving urethan in chloral. It appears in the form of crystals, soluble in alcohol, sparingly so in water and fusing at 106° C. [222·8° F.] It has a bitter taste and volatilizes without decomposing. According to Puppi, ural is the most rapid and certain of all known hypnotics. It gives rise to no modification of blood pressure. No accidents have resulted from its use. Thus far it has been prescribed with apparent success in cardiac affections, mental maladies and hysteria.—*Revista med.; Nouv. Rem.*, May 24.

Mixture of Exalgin.—According to M. H. Jouisse (*Nouv. Rem.*, July 8) an agreeable and unalterable preparation of exalgin may be made as follows: Exalgin, 2 gm.; tr. aurant. cort., 5 gm.; syr. aurant. flor., 30 gm.; aq. dest., 120 gm. The exalgin should be dissolved in the tincture and the syrup added; afterwards the water. A tablespoonful contains 20 cgm. of exalgin.

Differential Characters of Strychnine and Exalgin.—A few practical points are thus presented by M. H. Jouisse, *Nouv. Rem.*, July 8: Exalgin (ortho-methylacetanilid)—an odor of raspberry, increasing with heat; no bitter taste; causes anæsthesia on the point of the tongue; on trituration the raspberry odor is disengaged; a solution of tannic acid added to a solution of exalgin gives no precipitate. Strychnine—a slight ethereal odor; bitter taste without anæsthesia; trituration gives an odor as of scorched bread; tannic acid solutions give flocculent precipitate; with permanganate of potash (the mixture being treated with sulphuric acid) strychnine gives an orange color, turning to a brick red. Exalgin gives a brown color which so remains, although it gets gradually paler. The writer presents these reactions in the fear that strychnine and exalgin may be mistaken for each other on account of the close resemblance of their crystallized preparations.

Sugar of Milk as a Diuretic.—In a communication to the *Académie de Médecine* Prof. Germain Sée reports his researches concerning lactose, which he describes as the substance to which milk owes its power as a diuretic. He found that potions containing 100 gm. of lactose "produced an enormous diuresis such as cannot certainly be obtained with 4 or 5 liters of milk." He thought that in milk the action of lactose is obstructed by the presence of casein and fat. In cardiac cases, with dyspnœa, the lactose should be combined with iodide of potassium.—*Nouv. Rem.*, June 24.

Odorless Valerian.—M. Jouillard lately examined some of Meglin's pills, which, though composed of extract of valerian, were free from the characteristic odor of that drug. He learned that the pills had been made from an extract prepared *in vacuo*. The removal of air pressure had caused the aromatic principle to volatilize.—*S. de Ph. de Paris; Répert. de Phar.*, June 10.

SOME SUGGESTIONS FOR THE USE OF LANOLIN IN PHARMACY.

By A. Ball.

Lanolin, the purified fat of sheep's wool, discovered for use commercially by Liebreich, is now so well known that little need be said about its composition. Its consistence is somewhat elastic and sticky, and in order to make it more pliable it is necessary to dilute it with a substance which will not detract from its penetrating power. What is to be used? is frequently asked in dispensing. The fact that lanolin will take up twice its own weight of an alkaline solution should not be lost sight of. In the preparation of ung. potassii iodidi B. P. with lard, it is first necessary to saponify the lard with potassii carbonas, when the soap will take up the iodide, which is subsequently decomposed again by the soap, iodine being set free, as indicated by the decoloration. With lanolin the case is different, as the solution is perfectly absorbed by the fat. I recently made some experiments with the ointment, prepared with three different bases. No. 1 with equal parts lard and lanolin. No. 2 with equal parts vaselin and lanolin. No. 3 lanolin with 30 per cent. added distilled water.

These ointments were severally spread on pieces of membrane, previously tested as to permeability by dialysing 1 oz. of cochineal solution. After standing twelve hours on the septum no difference in color could be discerned; the membranes were then washed, and the ointments evenly spread over the surface, to within an inch of the outside. After dialysing for twenty-four hours at 50° F, No. 3 only gave the iodine reaction. I then kept them in a temperature of 80° F. for twenty-four hours, when I found No. 3 gave a copious precipitate, No. 2 less, and No. 1 still less, when tested with nitrate of silver solution, showing that most iodide had passed through the membrane in the case of the lanolin base. Fat had also passed through in each case. I reasoned that if the ointment would pass through a dead membrane it would most certainly pass through a living one, osmosis being the same in each case. Osmotic action has doubtless to perform a most important part in the absorption of medicinal agents when applied as ointments.

Oleates are especially adapted for mixing with lanolin. Dr. Shoemaker very clearly proved the peculiar penetrating properties of the oleic acid preparations, when applied as ointments or dusting powders. Whilst paraffin ointments prevent penetration of the cuticle by forming a superficial varnish on the skin, lanolin assists the osmotic action. For instance, an ointment of oleate of cocaine and lanolin, applied along the course of the nerve in facial neuralgia, quickly relieves the pain, and causes local anæsthesia. Then there is another important point in favor of lanolin, as an excipient in making suppositories of potass. bromid., ext. belladonnæ, acid. carbolici, etc., or any other substance soluble in an equal quantity of water.

The anhydrous lanolin stiffened with cocoanut butter or stearin will make a perfect suppository. First dissolve the medicament; work up with the lanolin and add to the melted cocoa-butter or stearin, and pour into moulds. The suppository is readily melted at body heat; being elastic it is not easily broken, and it is more readily retained in the rectum and quickly absorbed by the membranes. Lanolin may also be used for making "hair cream." If hot water is gradually added to the lanolin in a warm mortar, stirring all the time, any consistency of cream may be obtained. When nicely scented with rosemary oil and otto, with which cantharidin solution (1 gr. in 1 drachm s.v.r., sufficient for Oj.) has been mixed carefully, the preparation will keep well, and render the hair smooth and glossy, besides being less expensive than a mixture of oils.

In conclusion, I would beg to draw attention to the fact, that solutions of salts hitherto non-miscible with lard and paraffin may be easily and perfectly incorporated with lanolin; for instance, solution of potassium permanganate is not reduced. As the lanolin keeps perfectly a long time, no fear of finding the stock of an ointment rancid need ever be entertained.—*Phar. Jour. and Trans.*, May 25, 1889.

WALNUT OIL.

By Thomas T. P. Bruce Warren.

This oil, which I obtained from the fully ripened nut of the *Juglans regia*, has so many excellent properties especially for mixing with artists' colors for fine art work, that I am surprised at the small amount of information available on this interesting oil.

Walnut oil is largely used for adulterating olive oil, and to compensate for its high iodine absorption it is mixed with pure lard oil olein, which also retards the thickening effect due to oxidation. The marc left on expression of the oil is said to be largely used in the manufacture of chocolate. Many people, I am told, prefer walnut oil to olive oil for cooking purposes.

The value of this oil for out-door work has been given me by a friend who used it for painting the verandas and jalousies of his house (near Como, Italy) some twenty years ago, and which have not required painting since. In this country at least, walnut oil is beyond the reach of the general painter, and I do not know that the pure oil is to be obtained as a commercial article, even on a small scale.

It was in examining the properties of this and other oils, used as adulterants of olive oil, that I was obliged to prepare them so as to be sure of getting them in a reliable condition as regards purity. The walnuts were harvested in the autumn of 1887, and kept in a dry airy room until the following March. The kernels had shrunk and contracted a disagreeable acrid taste, so familiar with old olive oil, in which this has been used as an adulterant. Most oxidized oils, especially cotton-seed oil, reveal a similar acrid taste, but walnut oil has, in addition, an unmistakable increase in viscosity. The nuts were opened and the kernels thrown into warm water, so as to loosen the epidermis; they were then rubbed in a coarse towel, so as to blanch them. The decorticated nuts were wiped dry and rubbed to a smooth paste in a marble mortar. The paste was first digested in CS_2, then placed in a percolator and exhausted with the same solvent, which was evaporated off. The yield of oil was small, but probably, if the nuts had been left to fully ripen on the trees without knocking them off the yield might have been greater. It is by no means improbable that oxidation may have rendered a portion of the oil insoluble. The decorticated kernels gave a perfectly sweet, inodorous, and almost colorless oil, which rapidly thickens to an almost colorless, transparent, and perfectly elastic skin or film, which does not darken or crack easily by age. These are properties which for fine art painting, might be of great value in preserving the tinctorial purity and freshness of pigments.

Sulphur chloride gives a perfectly white product with the fresh oil, but, when oxidized, the product is very dark, almost black. The iodine absorption of the fresh oil thus obtained is very high, but falls rapidly by oxidation or blowing. A curious fact has been disclosed with reference to the oxidation of this and similar oils. If such an oil be mixed with lard oil, olive oil, or sperm oil, it thickens by oxidation, but is perfectly soluble. Such a mixture is largely used in weaving or spinning. Commercial samples of linseed oil, when cold drawn, have a much higher iodine absorption, probably due to the same cause. Oils extracted by CS_2 are very much higher than the same oils, especially if hot pressed.—*Chem News*, June 14, p. 279.

KERATIN AND KERATINIZED PILLS.[1]

By E. Bourquelot.

Under the name "keratin" are designated certain products obtained by exhausting different horny tissues, such as bristles, nails, horn, feathers and epidermal tissue, successively with ether, alcohol, water and dilute acids. Although these present among themselves, according to their origin, differences of composition, they may be classed under the same designation by reason of the chemical and physical properties they possess in common. In the dry state they are all very hygroscopic, but nevertheless they do not swell much in water. If they are subjected under pressure to the action of water at 150° C. they are decomposed, sulphuretted hydrogen being given off.

Keratin swells in cold and dissolves in hot concentrated acetic acid. When boiled in dilute sulphuric acid it is decomposed, yielding leucine, tyrosine and asparagic acid. Keratin swells in alkalies and dissolves in them when heated, and if an acid be added to an alkaline solution sulphuretted hydrogen is evolved.

The centesimal composition of the products designated as keratin, so far as they have been studied up to the present, varies within the following limits: C, 50·3–52·5; H, 6·4–7; N, 16·2–17·7; O, 20·7–25; S, 0·7–5. It would appear from their composition that these products are intimately related to the albumenoid substances.

Keratin has been employed and recommended by Unna and Beiersdorf for the making of "keratinized pills" or "pills for the small intestine." Pills coated with a layer of keratin, which is insoluble in the gastric juice, are not dissolved until they reach the intestines, when they come under the action of the alkaline bile which dissolves the keratin.

The medicines which may advantageously be administered under this form are rather numerous. Among them may be mentioned:

---

[1] *Journal de Pharmacie et de Chimie;* reprinted from *Phar. Jour. and Trans.*, June 22, p. 1035.

(1) Medicines that can by prolonged contact cause irritation to the mucous membrane of the stomach: arsenic, salicylic acid, creasote, chrysarobin, quinine compounds, copaiba balsam, cubebs, ferruginous preparations and especially perchloride of iron, opium, mercurial preparations and especially biniodide and bichloride of mercury, phosphorus and all the tænifuge preparations.

(2) Medicines that can injure the digestion by giving insoluble precipitates with pepsin and peptones: tannin, alum, acetate of lead, preparations of bismuth, nitrate of silver, corrosive sublimate, etc.

(3) Medicines that are rendered inactive or decomposed by the gastric juice: alkali, bile, soap, sulphide of calcium, sulphide of iron, pancreatin, etc.

(4) Medicines which should arrive in the intestines as concentrated as possible: kousso, santonin, extract of male fern, alkali.

For the preparation of a solution of keratin suitable for the coating of pills several formulæ have been proposed, in all of which either acetic acid or ammonia figures as a solvent. As, however, certain medicines are modified or decomposed by one or other of these substances, a choice of formula should be made according to circumstances. For instance, the acetic solution might be used for coating pills containing salts of mercury, gold or iron, arsenic, creasote, salicylic acid, tannin, alum, etc. On the other hand, an ammoniacal solution might be had recourse to for pills containing pancreatin, trypsin, bile, alkalies, sulphide of iron, etc. For certain other substances, such as naphthaline, it is immaterial which of the solutions is used.

Keratin is prepared by Unna by steeping parings of horn in a digestive liquid composed of pepsin, 1 gram, hydrochloric acid, 1 gram, and water, 11 grams, as long as the shavings yield anything to the solvent. The residue is then dissolved in ammonia by maceration lasting several weeks, after which the solution is evaporated.

Gissmann boils the quills of birds' feathers in glacial acetic acid for twenty-four to thirty-six hours in a retort furnished with a return condenser. A thick yellow-brown liquid is thus obtained, which is filtered through glass wool, evaporated on a water-bath to the consistence of an extract and afterwards dried.

Dieterich employs Gissmann's process, but before the treatment with acetic acid he subjects the feathers to ten hours' digestion in water and then to eight days' maceration in a mixture of equal weights of ether and alcohol, to eliminate fatty matters and cholesterin.

Keratin obtained by one of the foregoing processes is dissolved with the aid of a gentle heat either in acetic acid or ammonia and the solution is allowed to clear by standing. Fischer recommends the employment of seven parts of keratin with either 100 parts of acetic acid or a mixture of equal parts of ammonia and dilute alcohol.

If the pill mass should contain water, the pills would shrink and fissures would be produced in the keratin coating. It is, therefore, recommended to use in the making of these pills a mixture of yellow wax, 1 part, and suet or cacao butter, 10 parts. It is also necessary to avoid the use of vegetable powders and to employ in their place kaolin or charcoal powder.

When the pills are finished they should be dipped in cacao butter, rolled in charcoal powder and then keratinized. For this purpose the pills, placed in a porcelain capsule, are sprinkled with a suitable quantity of keratin solution and then shaken together until the evaporation of the solvent takes place. This moistening and drying requires to be repeated several times (as many as ten) before the layer of keratin is sufficiently thick.

The process employed for coating pills with gelatin, which consists in dipping into the solution the pill fixed on the point of a needle, is not suitable here, for it leaves a hole through the keratin coating that can never be completely closed.

In order to ensure that the keratin used is insoluble in the stomach, Unna recommends that a preliminary experiment should be made with sulphide of calcium pills coated with it. If in the course of some hours after such pills are taken eructations of sulphuretted hydrogen are observed, it would indicate that the pills have been dissolved in the stomach. When the keratin is of good quality nothing of the kind should occur. Finally, to complete the test, the pills when placed in water should not liquefy or crack.

Iodide of starch as a disinfectant in gastric disturbances is recommended by Dr. Yerseienko in doses of 0·1 to 0·3 for children, and 0 5 gm. for adults. It may be given in the form of powder or pill, and may be combined with Dover's powder.—*Dtsch. Med. Woch.*

NOTE ON THE DILUTION OF COW'S MILK IN INFANT FEEDING.

By Geo. Smith, F. C. S.

The following may be of interest as having a bearing on Dr. Rotch's article on this subject published in the *Pharm. Jour.* for March 2, page 706. The writer, in September, 1886, had occasion to consider this question in his daughter's case, owing to the mother's deficiency in milk. The food used as a substitute on that occasion has proved so successful in more than one case that it merits recording.

The formula is mainly based on a process devised by Professor Frankland in rearing one of his own children (*vide* "Experimental Researches," pp. 843, 844).

In his paper (published December, 1854) Prof. Frankland gives the percentage amounts of the different constituents of human, ass's, and cow's milk as follows:—

	Woman.	Ass.	Cow.
Casein	2·7	1·7	4·2
Butter	3·5	1·3	3·8
Milk-sugar	5·0	4·5	3·8
Salts	·2	·5	·7

These figures for human and cow's milk differ in several respects from the averages deduced from a wider range of analyses which are quoted by Mr. Thos. Maben in a paper published in the *Pharm. Jour.* for March 23 (pp. 768–769), the most notable differences being those of sugar and fat; but on referring to the *minimum* and *maximum* figures found by Prof. Leeds,[1] from analyses of 80 samples of human milk from different sources, it will be seen that those given by Professor Frankland provide him with a basis for a formula which produces a fair imitation of human milk from that of the cow.

In this formula Professor Frankland takes no account of the differences in *coagulable* and *non-coagulable* albuminoids existing in each of the respective milks. His process practically consists in a precipitation (by means of rennet) of one-third of the casein from fresh cow's milk, and the addition of one-third more milk-sugar, but this was found by the writer somewhat tedious except to a specially trained person. The process of dilution with water was adopted because it was simpler and would enable the food to be prepared in a few minutes whenever it was required.

---

[1] *Pharm. Jour.*, [3], xv., p. 580.

Taking Professor Frankland's figures for the average of fresh cow's milk, as quoted, it will be seen that when it is diluted with water in the proportion of 3 parts of the former to 2 parts of the latter the average amount of constituents is modified as follows:

Fresh cow's milk 3 parts, water 2 parts—

Casein	2·52	per cent.
Fat	2·28	"
Sugar	2·28	"
Ash	·42	"

From these figures the writer compiled the following formula.

The albumenoids, fat, and milk-sugar are by calculation made to approximate as nearly as possible to the average of these constituents in human milk.

Finely ground oatmeal	¼ gradually increasing to ½ oz.
Fresh butter	1 drachm.
Milk-sugar	2 drachms.
Fresh cow's milk	6 fluid ounces.
Pure water	4 fluid ounces.
Salt	5 grains, or a sufficiency.

Mix gradually the water with the oatmeal, milk-sugar, and salt, so that no lumps are formed in the mixture, then add the milk and butter, and heat to the boiling point in a clean, enamelled saucepan. The product should be made up to the measure of half a pint, if necessary, and given lukewarm with a spoon when required.

The oatmeal was introduced as a useful attenuant, and it has been found to act as a laxative; and also as a direct fat and heat-producer in the process of digestion. The process of feeding with a spoon is at first troublesome, but it is to be preferred to the use of a feeding bottle, as, if care be taken to have all the vessels employed scrupulously clean, the infant will enjoy an immunity from thrush (*Oidium albicans*), diarrhœa, and other diseases that follow in their train.—*Phar. Jour. and Trans.*, July 6, p. 3.

OXIDATION OF MILK-SUGAR.[1]

By E. Fischer and J. Meyer.

Lactobionic acid, $C_{12}H_{22}O_{12}$, is obtained when milk-sugar (1 part) dissolved in water (7 parts) is treated with bromine (1 part) at the ordinary temperature, the mixture being frequently shaken. The bromine dissolves in the course of one to two days and, after keeping for another 48 hours, a stream of air is passed through the solution to drive off most of the free bromine, the remainder being converted into hydrobromic acid by passing hydrogen sulphide into the cooled solution. The quantity of hydrobromic acid present having been ascertained by titrating a portion of the solution with silver nitrate, the calculated quantity of lead carbonate is added, and the hydrobromic acid remaining in the filtered solution is carefully precipitated with silver oxide. The solution is filtered, treated with hydrogen sulphide, and the filtrate evaporated. The acid, syrupy liquid thus obtained is agitated for a long time with large quantities of cold glacial acetic acid to remove reducing substances and other products, the colorless residue, the weight of which is about one-third that of the lactose employed, is dissolved in water and the warm solution precipitated with a hot, concentrated solution of basic lead acetate. The solution of basic lead acetate is prepared by dissolving the neutral salt (2 parts) and lead hydroxide (1 part) in hot water (3 parts) and dissolving the crystals, which separate on cooling, in pure, hot water. The precipitated lead salt is quickly separated by filtration, washed with hot water, and then suspended in cold water and decomposed with hydrogen sulphide. The filtrate is evaporated on a water-bath in a partial vacuum, the residue treated with alcohol and ether to remove acetic acid, and finally dissolved in a small quantity of water and reprecipitated with alcohol and ether.

Lactobionic acid is a colorless, strongly acid syrup, and is very readily soluble in water, but only very sparingly in alcohol and glacial acetic acid, and is insoluble in ether. It decomposes carbonates, but does not reduce Fehling's solution even on boiling. The *calcium*, $(C_{12}H_{21}O_{12})_2Ca$, *barium*, $(C_{12}H_{21}O_{12})_2Ba$, *cadmium*, and *lead* salts were prepared by warming an aqueous solution of the acid with the corresponding carbonate; they are all insoluble in alcohol, but readily soluble in water excepting the basic lead salt. On evaporating the aqueous solution over sulphuric acid, the salts are obtained in the form of syrups which gradually solidify but do not clearly show a crystalline structure.

Lactobionic acid is decomposed into galactose and gluconic acid when warmed with dilute mineral acids. The pure acid was heated at 100° for an hour with 5 per cent. sulphuric acid; the gluconic acid was then isolated by means of the barium salt, and identified by

---

[1] *Berichte*, xxii., 361—364; *Jour. Chem. Soc.*, May, 1889.

converting it into the calcium salt (Kiliani, *Annalen*, ccv, 184). The filtrate was evaporated, and the galactose, which crystallized from the solution, identified by converting into the osazone.

The formation and decomposition of lactobionic acid confirm Fischer's conclusions, (1888,) with regard to the constitution of milk-sugar.

An acid, isomeric with lactobionic acid, can most probably be obtained from maltose by the process described above; this compound, on inverting, should yield gluconic acid and dextrose.

THE COMPOSITION OF TRAGACANTH.

By John Ogle, M. P. S.

An article headed "The Soluble Gum of Tragacanth," by Professor J. M. Maisch, reprinted from the *American Journal of Pharmacy*, suggested that some uncertainty exists as to the composition of this drug. The statements made in the various works on materia medica referred to in that article are so conflicting that it was felt that another investigation would not be out of place. Accordingly an examination was carried out with the object of determining the amount of moisture and soluble gum present; to what extent the soluble portion resembles gum acacia; and the percentage of ash yielded.

A sample of fine Syrian tragacanth, answering to the "characters" of the Pharmacopœia, was obtained through the courtesy of Mr. C. Umney. Of this, 5 grams, maintained at a temperature of 100° C. for twenty-four hours, left a residue weighing 4·054 grams, the loss of ·946 gram being equivalent to 18·92 per cent. of moisture.

The dried gum was powdered: to 3 grams of the powder 250 cc. of distilled water were added, and the mixture was heated to 80° C. for six hours, in order to effect disintegration. To the resulting semifluid mass, which was too viscid to allow of filtration, distilled water was added so as to increase the volume to a litre. After standing for two hours the fluid was thrown upon a wet filter, when a bright, colorless solution, neutral to test paper, was slowly obtained. 100 cc. of this liquid, representing the soluble constituents of ·3 gram of the dried sample, yielded on evaporation a transparent residue which weighed ·133 gram, equal to 44·33 per cent. of soluble gum calculated for the dried, or 35·94 per cent. for the natural tragacanth. This residue having been ignited left an ash, which, on examination, was found to consist chiefly of calcium and potassium phosphates.

The filtrate answered to the tests given under gum acacia in the Pharmacopœia, the precipitate resulting from the addition of rectified spirit rising to the surface as a transparent gelatinous mass; subacetate of lead produced a white opaque jelly. On the other hand, it differed from arabin in giving a clear solution with borax, and in the absence of precipitates when treated with sodium stannate and sodium silicate; also, by the production of a white precipitate in the presence of neutral lead acetate. After boiling with hydrochloric acid it readily reduced Fehling's solution. Both the soluble and insoluble portions yielded mucic acid when heated with strong nitric acid. The water-insoluble gum readily dissolved in potassium hydrate, whereas lime water appeared to have little or no solvent action.

Two grams of the tragacanth left on ignition ·055 gram of ash, equal to 2·75 per cent. which was partly soluble in water, the dissolved material consisting mainly of the phosphates of sodium and potassium, the insoluble portion containing calcium carbonate, with traces of magnesium salts.

These then are the tabulated percentage results obtained :—

Moisture	18·92
Soluble gum	35·94
Ash	2·75
Insoluble gum (by difference)	42·39
	100·00

No evidence of the presence of starch could be obtained, the iodine test producing no coloration,[1] nor could the official statement that "after maceration in cold water the fluid portion is not precipitated by the addition of rectified spirit" be verified. In fact, as stated above, alcohol at once gave an evident precipitate.—*Phar. Jour. and Trans.*, July 6, p. 3.

Creosote and Codliver Oil have been combined in phthisical and chronic catarrhal affections and were usually prescribed Creasote 2·5; Codliver Oil 200; Saccharin 0·1; adult dose a tablespoonful.—*Therap. Monatsh.*

---

[1] We have examined many samples of flake tragacanth of various grades, and invariably found starch present; we know of no other author having found tragacanth free from starch —Editor *Am. Jour. Phar.*

SOLUBLE PRUSSIAN BLUE.[1]

By C. E. Guignet.

Ordinary soluble Prussian blue is a compound of Prussian blue with potassium ferrocyanide. It is easily obtained by gradually adding to a boiling solution of 110 grams of potassium ferricyanide a hot solution of 70 parts of crystallized ferrous sulphate. The mixture is boiled for two hours, filtered, and the precipitate washed until the washings become dark blue. It is then dried at 100°, and has a fine deep-blue tint, and is very soluble in water. Admixed potassium ferrocyanide can be removed by washing with alcohol of 40 per cent. The compound is precipitated from its solution by sodium sulphate, sodium chloride, etc., but when the salts are removed by washing it redissolves. With salts of lead, zinc, and other metals, it yields, as Wyrouboff observed, a series of well-defined blue compounds.

Colloidal Prussian blue was obtained by Graham by dialysis. Pure soluble Prussian blue is obtained by suspending purified Prussian blue in a saturated solution of oxalic acid, filtering, and allowing the mixture to remain for two months. Prussian blue is completely precipitated, and the liquid is quite colorless. After thorough washing with dilute alcohol, the precipitate is readily soluble in pure water. The same result is obtained in a very short time by precipitating the oxalic acid solution with strong alcohol or by a concentrated solution of sodium sulphate, and washing the precipitate with dilute alcohol. Ammonium oxalate or tartrate can be used instead of oxalic acid.

If the oxalic acid solution is boiled, insoluble Prussian blue is precipitated, a result due to the action of the acid and not to the rise of temperature. Dilute sulphuric acid has the same effect at the ordinary temperature, and the precipitate does not dissolve even after long washing. The soluble and insoluble modifications have the same composition.

When Prussian blue is heated with water and molybdic anhydride, it yields a deep-blue solution which is not affected by boiling or by gelatin. It is precipitated by sulphuric or nitric acid, but if the precipitate, which retains a small quantity of molybdic anhydride, is well washed with dilute alcohol, it dissolves in pure water. Ammonium molybdate and tungstate will also dissolve Prussian blue.

When Prussian blue is treated with concentrated sulphuric acid, it yields a soft, white mass like starch-paste, and if the temperature rises is partially decomposed. Hydroferrocyanic acid is liberated and partially dissolves in the excess of sulphuric acid. If the liquid is filtered through glass-wool and the filtrate cooled, it deposits the acid in long needles. The same result is obtained with lead or copper ferrocyanide.

---

[1] *Compt. rend.*, cviii, 178—181; from *Journ. Chem. Soc.*, May, 1889.

If Prussian blue which has been treated with sulphuric acid, is treated with absolute alcohol, it re-acquires its blue color and dissolves in the alcohol. The same solution is obtained by dissolving solid Prussian blue in a mixture of equal volumes of sulphuric acid and alcohol. When mixed with water or with a large excess of strong alcohol, the solution yields a precipitate of ordinary prussian blue, which retains sulphuric acid even after prolonged washing with dilute alcohol. Ethyl hydrogen sulphate does not dissolve Prussian blue, and hence the phenomena just described cannot be attributed to the formation of this compound.

ON THE NATURE OF COBALT AND NICKEL.

By Dr. Fleitmann.

As the author first found in the *Chemiker Zeitung* an account of the surprising communication of HH. Krüss and Schmidt (Amer. Jour. Phar., 1889, p. 132) that a new, hitherto unknown, metal was present in nickel and cobalt, he ventures, in the interest of the nickel industry, upon the following remarks. He has repeatedly and carefully examined the most different sorts of nickel and of cobalt oxides of commerce, according to the indications of HH. Krüss and Schmidt, and even on taking 50 gm. of material he has not been able to obtain ponderable quantities of a substance which would justify the supposition of the presence of a new metal.

The author's experiments were not dictated by an intention to intrude into an investigation which HH. Krüss and Schmidt have reserved for themselves. The interests of the nickel industry, in which he has been concerned for thirty-eight years, made it his duty to decide as quickly as possible so important a fact as the existence of the new metal. After obtaining negative results in his experiments he wrote on Feb. 13th to Dr. Krüss, requesting a small portion of the new metal so as to convince himself of its existence. Dr. Krüss replied on March 29th, promising to forward some preparations. Up to date they have not arrived, and as the writer's continued experiments have proved fruitless, he suspects that "gnomium" exists merely in the imagination of its discoverers. He expects, therefore, from HH. Krüss and Schmidt either a confirmation or a withdrawal of their communications.

According to Dr. Fleitmann's experiments he concludes: (1). That if cobalt and nickel are regularly accompanied by a hitherto unknown metal this can exist only in extreme traces, and not in quantities up to two per cent. (2). That these traces have no essential influence on the ductility of the nickel, which, in its present state of purity, is as flexible and ductile as the softest iron. (3). That the methods of purifying nickel, patented by Dr. Krüss, are devoid of practical value since they are in part not novel and in part not feasible.

If the nickel and cobalt of trade in the state of hydroxide are treated, as according to Krüss and Schmidt, with excess of sodium hydroxide, we certainly obtain, according to the purity of the materials, varying quantities of the different impurities present in these oxides along with small quantities of nickelous and cobaltous oxides. According to the origin of the sample the impurities consist of small quantities of lead and zinc oxides, arsenic, manganic, molybdic, and silicic acids, alumina, cerium oxides, and chromic acid. The nickelous or cobaltous oxide dissolved does not in general exceed $\frac{1}{20}$ per cent. of the oxide used. If it is separated from the other impurities which exist in solution in the alkaline liquid and converted into nickelous or cobaltous oxide, it is afterwards insoluble in soda-lye, whence its solubility appears to depend on the presence of those impurities, especially arsenic acid, silica, and alumina. If the alkaline extract of the above impurities is mixed with hydrochloric acid until the precipitate formed at first is re-dissolved and ammonium carbonate is then added, there is obtained a wonderful mixture of oxides and acids well calculated to serve as a puzzle. It seems to the author not unlikely that HH. Krüss and Schmidt have met with such mixtures. Their precaution to form the alkaline extract at a low temperature (10°) confirms him in his conjectures, as precipitates often appear on applying heat. Manganic acid and dissolved lead oxide are sometimes converted into manganic oxide and lead peroxide. Still this is merely conjecture, and he is ready to be convinced to the contrary by more decisive proofs than the discoverers have as yet advanced for the existence of the new element.—*Chemiker Zeitung*, June 12, 1889.—*Chem. News*, July 5, p. 9.

ARTIFICIAL DIASTASE.[1]

By A. Reychler.

When freshly prepared wheat gluten is digested at 30–40° for a few hours with very dilute acids, considerable quantities of albuminoïds are dissolved, forming an opalescent solution. The acids or acid salts employed were hydrochloric acid, hydrogen potassium sulphite, phosphoric acid, alkaline dihydrogen phosphates, acetic acid, formic acid, tartaric acid, and lactic acid.

This opalescent solution is not coagulated by boiling; it gives a precipitate with a few drops of very dilute potash, soluble in excess. It becomes clear on adding two volumes of alcohol, but a turbidity is generally produced when the alcohol is added in large quantities. It gives a precipitate with potassium ferrocyanide, soluble in a large quantity of acetic acid. Mercuric chloride seems to produce no precipitate.

Tincture of guaiacum and hydrogen peroxide produce an intense blue coloration, but not if the solution has been previously boiled or treated with too much acid. A solution of the gluten from wheat flour (10 grams) in acetic acid ($\frac{1}{10000}$ 50 cc.), gives this reaction most distinctly. This behavior, according to Lintner, is characteristic of diastase.

The gluten solutions have a fermentive action similar to that of diastase, but they lose their property partially or completely when boiled, or in presence of alkalis or of too much acid. The gluten from 20 grams of wheat flour was digested for a few hours with 100 cc. of an aqueous solution (500 cc.) of potassium dihydrogen phosphate (1 gram). 2 cc. of the solution were then added to starch (2 grams, 88 per cent.) made into a paste with water (250 cc.), and the mixture kept for five hours at 40–50°. The solution thus obtained reduced 135 cc. of Soxhlet's alkaline copper solution.

The soluble albuminoids present in wheat flour also contain diastase, as can be proved by Lintner's reaction. Starch (4 grams) made into a paste with water was digested for two hours at 60–66°: (1) with an aqueous extract from 1·6 grams of wheat flour, and (2) with a similar extract to which 2 cc. of hydrochloric acid ($\frac{1}{1000}$) had been added. At the end of this time the solutions still contained unchanged starch, and reduced 100 cc. and 210 cc. of Soxhlets solution respectively, showing that a trace of acid increases the rapidity of fermentation.

---

[1] *Ber.*, xxii, 414–419; from *Jour. Chem. Soc.*, June, p. 621.

The disastase-like action of the soluble albuminoïds in ungerminated barley can also be proved experimentally, and the author gives a table showing the reducing power of the solutions obtained when ungerminated barley (2 samples), maize, and malt, respectively, mixed either with water alone or with water and a trace of acetic or metaphosphoric acid, are kept at a suitable temperature. Under the above conditions, the starch in the grain is only slowly acted on; it was found that fermentation takes place much more rapidly when starch-paste is treated with a relatively small quantity of ungerminated barley. The results of experiments in this direction, in presence or in absence of a trace of acetic acid, are also given in a table.

The author considers that it is not improbable that in the germination of barley and other seeds, the solubility and fermentive power of a portion of the albuminoïds is produced by reactions similar to those which occur when gluten is dissolved in very dilute acids.

ALKALOÏDS OCCURRING WITH COCAÏNE.[1]

By A. Einhorn.

Liebermann and Giesel have recently shown that when the amorphous bases occurring with cocaïne are boiled for an hour with hydrochloric acid, they are chiefly converted into ecgonine and acids. This fact has long been known technically. The bases are warmed for three to four days with concentrated hydrochloric acid, the solution is diluted with water, and after separating the acids, concentrated and mixed with ether, whereon most of the ecgonine hydrochloride separates immediately. The filtrate, after freeing from alcohol and ether, is kept for some months so that the rest of the salt may separate, then diluted with water to precipitate small quantities of resinous matter, and again evaporated to a syrup.

The author has investigated a syrup obtained in this manner. It was dissolved in water, separated from resinous substances, mixed with soda and the bright yellow precipitate, which consists chiefly of an amorphous substance, dried and extracted with absolute alcohol. The filtrate from the yellow precipitate contains anhydroecgonine, which can be isolated by acidifying with hydrochloric acid, removing resinous impurities by shaking with ether, evaporating and extracting the crystalline residue with absolute alcohol.

---

[1] *Ber.*, xxii, 399–402; from *Jour. Chem. Soc.*, June, p. 628.

A *chloro*-derivative, probably $C_{26}H_{32}N_3ClO$, is obtained in colorless needles, when the alcoholic extract from the yellow precipitate referred to above is evaporated, the residue boiled with water to remove inorganic compounds, and recrystallized from alcohol with addition of animal charcoal. It melts at 220·5°, and is not changed when warmed with silver nitrate solution. It forms salts with the halogen acids; the *hydrobromide*, $C_{26}H_{32}N_3ClO$, 3HBr, crystallizes from methyl alcohol in colorless prisms, and has an intensely bitter taste.

When anhydroecgonine is heated at 270° with hydrochloric acid, methyl chloride, hydrocarbons, ammonia, methylamine, and resinous products are formed together with two basic compounds, both of which are volatile with steam. These two bases can be separated by dissolving in hydrochloric acid and treating with sodium nitrite. One yields a nitroso-compound which, on decomposing with hydrochloric acid, is converted into a crystalline *hydrochloride*. The other base is not acted on, and is obtained unchanged when the solution is made alkaline and distilled; it yields a sparingly soluble *aurochloride* melting at 212°. A distillate, smelling strongly of pyridine, is obtained when the bases are evaporated with hydrochloric acid, and the residue distilled with zinc-dust. The distillate contains a hydrocarbon and two new bases which can be separated by means of their aurochlorides. The more readily soluble salt melts at 108°; the other contains 46·96 per cent. of gold, and does not melt when heated at 280°.

AMERICAN PHARMACEUTICAL ASSOCIATION.

The thirty-seventh annual meeting convened in Odd Fellows' Hall in the city of San Francisco on the afternoon of Monday, June 24th. President M. W. Alexander, of St. Louis, occupied the chair and called the meeting to order. After prayer offered by Rev. W. H. Scudder, Mayor Pond was introduced and extended a cordial welcome to the members on behalf of the pharmacists and citizens of San Francisco and of the Pacific Coast, to which Mr. Ebert, of Chicago, responded. Dr. Melvin, president of the California College of Pharmacy, next addressed the meeting, expressing the gratification of the pharmacists of the Pacific Coast that the frequently extended invitation had at last been accepted, and giving a hearty welcome to the visitors present. After a brief response by the President, Mr. Alexander read the annual address, referring to the qualifications for membership, the work by sections, the financial tion of which is contemplated by the American Medical Association; to pharcondition and the different funds invested by the Association; to the approaching revision of the pharmacopœia; to the section of pharmacy the organizamacy laws and examinations by the pharmacy boards. The address was well received and was ordered to be referred to a committee of five for consideration.

A number of invitations were received, accepted and ordered to be acknowledged.

The Secretary of the Council presented the names of candidates recommended to membership, and read the minutes of that body since the last annual meeting; the business transacted by Council was approved.

The Committee on membership reported the roll to contain the names of 25 honorary and of 1,263 active members; during the past year 116 members had joined, but the loss during the same period was by resignation 34, dropped 60, died 16, total 110.

The report on delegations stated that credentials had been received from the Colleges of Pharmacy of California, Chicago, Cincinnati, Illinois, Louisville, Maryland, Massachusetts, National (Washington), New York, Philadelphia and St. Louis; from the State Pharmaceutical Associations of Alabama, Arkansas, California, Connecticut, Dakota (South), Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Minnesota, Missouri, Nebraska, New Hampshire, New Jersey, North Carolina, Ohio, Pennsylvania, Rhode Island, Virginia, Wisconsin; from the local Associations of Dauphin Co., Pa.; Detroit, Mich., and St. Louis Microscopists; and from the Alumni Associations of the California, Chicago, Cincinnati, Philadelphia and St. Louis Colleges of Pharmacy.

When, subsequently, the Nominating Committee was appointed it was found that the following States were represented: Arkansas, California, Connecticut, Florida, Illinois, Indiana, Iowa, Kentucky, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Jersey, New York, Ohio and Pennsylvania. At subsequent sessions representatives were also present from Oregon, Arizona and Honolulu.

Several short committee reports were read, and at the request of the Committee on the revision of the Pharmacopœia a special session was ordered to be held for the consideration of the report, the session to convene after the adjournment of the second session on Commercial Interests.

Second Session.—After the approval of the minutes of the first session and of the Council, the report of the Nominating Committee was received, and the following officers were elected for the ensuing year: Emlen Painter, New York, president; Karl Simmon, St. Paul, W. M. Searby, San Francisco, and J. W. Eckford, Aberdeen, Miss., vice-presidents; Leo Eliel, Indiana, Wm. S. Thompson, Washington, D. C., and J. H. Dawson, San Francisco, members of Council for three years; the treasurer, permanent secretary and reporter on the progress of pharmacy were re-elected.

An invitation was received for holding the next annual meeting at Asbury Park. N. J. This with others was referred to a committee consisting of Messrs. Painter of New York, Ebert of Illinois, and Robinson of Florida, for consideration and report.

Reports of officers and committees being in order, a letter from Prof. Diehl was read in reference to the report on the progress of pharmacy, which according to the by-laws is to embrace the publications to the end of June; it is intended to introduce some new features in the introductory part of the report.

The Committee on National Formulary will endeavor during the ensuing year to collect criticisms and suggestions, and arrange matters for active work.

The report of the Treasurer showed a total income from July 1, 1888 to May 1, 1889, of $12,067.37, which includes last year's balance of $2,376 07; annual dues, $5,070; from National Formulary, $4,145.52, the remainder being for certificates, proceedings sold life membership fees, etc. The current expenses since July, 1888, were $5,718.33, for National Formulary, $3,258.59; for funds, $124, total $9,120.92, leaving a cash balance on hand May 1st, of $2,946.45.

The Treasurer called attention to the fact that for three years past the current expenses of the Association had exceeded the amount of the annual dues collected.

The chairman of the Council reported the value of the different funds to be as follows: Ebert fund $811.78; Centennial fund $1,499.57; Life Membership fund $9,710.41; making the total invested funds $12,021.76.

The Secretary's statement on the National Formulary gives the total cost of printing and distributing the book up to April 30, at $3,440.29; total receipts, $4,141.12; bills receivable, $553.86; bills payable, $99.68; stock on hand, bound and unbound, 2249 copies; value at wholesale prices of 1378 copies sent to members and others, $708.70; total expenses of National Formulary Committee since 1885, $241.67.

These reports had been examined by the Auditing Committee and compared with the books and were found to be correct.

The Committee on Publication reported the total cost of last year's volume to be $4,056 77, referred to the favorable account of the National Formulary, and directed attention to the considerable reduction in price of the older volumes of the Proceedings, which it was hoped would induce many members to complete their sets.

The Committee on Prize Essays recommended the awarding of the Ebert prize for 1888, to Joseph F. Geisler of New York, for his essay on the morphiometric assay of opium.

Considerable discussion took place when the Committee on the next meeting requested on the part of the members present an expression in regard to the locality for holding the meeting. Besides Asbury Park, New Orleans, St. Louis, Indianapolis, New York, the White Mountains and other places were mentioned. The Committee subsequently reported in favor of holding the next meeting in New York City; but an amendment prevailed selecting Old Point Comfort, Va., where the next meeting will be convened on the second Monday in September, 1890.

The draft of a bill relating to pharmacists in the U. S. Navy was presented, and after some discussion was referred to the Section on Legislation with full power to act.

The Section on Commercial Interests held two sessions on Tuesday afternoon and evening. The Chairman and Secretary being absent, Mr. Leo Eliel occupied the chair and Mr. J. H. Dawson acted as temporary secretary. The discussion was mainly on the alcohol tax, a subject which had been discussed at previous meetings, and at the meetings of the various State Societies, so that new arguments could hardly be presented. Though there was some opposition to the removal of the internal revenue tax on alcohol, the large majority of those present were evidently in favor of it and adopted a resolution requesting the legislative section to take such action in reference to the abolition of this tax as the sentiment of the Association indicates.

A communication from Mr. T. D. Crawford, of North Carolina, relative to the indiscriminate sale of narcotics, was referred to the Section on Legislation.

The rebate plan intended to prevent the underselling of proprietary articles was discussed at some length, and after consideration by a committee, the outlines of a plan were approved by which it is presumed the cutting of prices can be prevented.

The section elected Leo Eliel, of South Bend, Ind., chairman, and F. B. Kilmer, of New Brunswick, N. J., secretary.

A Special Session, called for the consideration of the report of the committee on the revision of the U. S. Pharmacopœia, convened on Tuesday evening at 9.15. The report which makes recommendations relating to the principles and general features of the revision, was accepted and the recommendations taken up seriatim. Pending the consideration of the first recommendation, a paper was read by Prof. Bedford strongly advocating the retention in the pharmacopœial formulas of parts by weight. A lengthy discussion followed, most of the speakers favoring the measuring of liquors in making preparations; incidentally the process of percolation was alluded to, and Mr. Ebert contended that the old process of maceration would yield more uniform and reliable results in the hands of most pharmacists than displacement.

The admission into the pharmacopœia of synthetical remedies, the authority of the National Formulary, liquid extracts differing in strength from those at present recognized, etc., formed the subjects of the remaining recommendations, which were adopted in the following manner:

1. That it is the sense of this Association that in the next revision of the U. S. Pharmacopœia, all preparations—at least those for internal use, which are usually prescribed and administered by measure, be ordered to be made by weight and measure as in the former pharmacopœias; but that the Committee of Revision shall be at liberty to use the system of parts by weight in all other cases, and that they may use any other system as long as the measures or weights are commensurate with each other, and of such a character that the strength of the product or of any given fraction thereof can be readily ascertained without tedious calculations.

2. The Pharmacopœia should be relieved of all antiquated or little used material, such as a number of crude drugs, galenical preparations (simple and compound pills) etc.; all of which could be safely turned over to the pharmaceutical profession.

3. In view of the absolute necessity of recognizing such important medicinal chemicals as antipyrine, sulfonal, etc., the Association considers that the existence of a patent does not *in itself* constitute a bar against the reception of any medicinal agent in the pharmacopœia; but it is suggested that the revisers act with great care and circumspection, so that no patented substances except those of established worth, and irreplaceable by other remedies, be recognized, and that such compounds be recognized by descriptive chemical names and not by therapeutic names.

4. Regarding tests of identity and purity, it is the sense of this Association

that they shall be made as complete and rigid as it is practical to make them, and as will be fair to the manufacturers, the dispensing pharmacists and the purchasing public. While freedom from *injurious* admixtures should be insisted upon, the absence of an insignificant percentage of inert and unavoidable contamination can often be insured only at a greatly increased cost. A judicious decision should be made in each case, and the co-operation of the manufacturers invited so as to settle upon a basis which may be equitable to all.

5. This Association emphatically reiterates its declaration made at its last annual meeting that the Pharmacopœia shall and will be the sole official authority for all remedial agents treated of therein; that the National Formulary shall be authority only for such as are not covered by the Pharmacopœia, and that the authority of the National Formulary shall cease whenever the Pharmacopœia supersedes any of its processes or directions.

6. That alcoholic preparations representing fifty per cent. of the drug be adopted so far as practical to replace fluid extracts and tinctures.

A suggestion relative to the admission into the pharmacopœia of formulas for compound spirits analogous to compound spirit of juniper was negatived.

The Section on Scientific Papers held two sessions on Wednesday morning and afternoon, and a third session on Thursday forenoon; Professor Painter in the chair and Professor Whelpley secretary. The chairman read an address, making suggestions for regulating the business and facilitating the work of the Section, which, after having been considered by a committee, were approved with some modifications. The following papers were read:

Solution of Magnesium Citrate. Professor L. E. Patch suggests a modification of the pharmacopœial formula with the view of preventing crystallization of the normal citrate, and converting all the magnesia into the salt $MgHC_6H_5O_7$, by somewhat increasing the quantity of citric acid. To prepare six bottles of the solution the following quantities are recommended: 170 gm. citric acid, 78 gm. magnesium carbonate, 480 gm. syrup of citric acid, and 16 gm. potassium bicarbonate. Mr. Ebert and Mr. Maisch stated that they had not met with any difficulty in keeping, when using pharmacopœial quantities.

Arsenic in Wall Paper was the title of a paper presented by Professor D. H. Galloway. About one hundred samples had been examined, of which number twenty-five were free from arsenic, while the remainder contained compounds of that metal varying in quantity from traces to over 600 Mgm. As_2O_3 per square meter. It was stated that an attempt had been made in Massachusetts a few years ago to secure the enactment of a law limiting the arsenic in wall paper to 7 mgm. for each square meter; the bill, however, had failed to become a law. In the discussion following the importance of such papers was dwelt upon, and a resolution was passed that a copy of the paper be sent to the secretary of the American Public Health Association.

The effect of moisture as a preparatory step in the extraction of some drugs was discussed in a paper by Professor J. U. Lloyd. The succulent vegetable tissue in its natural condition is readily permeated by an appropriate alcoholic menstruum. Dried drugs are more difficult to extract, even after having been powdered; but after they have been softened the natural condition is re-established. The author suggests softening before percolation by spraying enough water on the powder; allow this to stand in a closed vessel for a considerable period and, where possible before packing in the percolator, to sprinkle it with enough alcohol to bring the liquids to the composition of the menstruum used for percolation. The interest in the subject was shown by the discussion, which touched upon the alteration of plant constituents by drying, the generation of new compounds in the presence of water, the popular use of some fresh plants and dried drugs, etc., and it was generally acknowledged that numerous and careful observations were necessary to throw more light on these subjects.

Photomicrography.—A paper by Professor A. B. Stevens and W. H. Krug describes a simple apparatus for taking magnified photographs of sections of drugs. Stained and unstained sections had been used, the latter yielding the better results. This was also the experience of Professor Maisch. Professor Whelpley stated that for the purpose of photographing Arnold's writing fluid makes an excellent stain.

The Pharmacopœial Nomenclature was presented by Professor O. Oldberg. The arguments cannot well be condensed; but the aim of the paper was to show the advantages of making the pharmacopœial titles English in form, using, however, terms only which may be properly used in scientific language; latinic titles were proposed as definitions of the former. Thus official titles would be, for example, Benzoic Acid, Allium, Anthemis, Water, Cornus, Ferric Chloride, to which the following latinic definitions would belong: Acidum benzoicum, Allii bulbus, Anthemidis flores, Aqua, Cornus radicis cortex, Ferricum chloridum.

Wool Fat or Lanoleum.—Mr. C. S. Hallberg treated in this paper of the preparation of this useful drug and gave a number of historical references, showing that this article was the first animal fat used in medicine and that from the beginning it had always been employed mixed with water, as it also exists naturally in the wool combined with water. Arguments were presented against the validity of the patent on its combination with water, and against the exclusive right to the use of the term *lanolin*, this being a descriptive term and not an arbitrarily selected name.

Donovan's Solution.—Mr. E. Goodman states that in Cincinnati this preparation is rarely prescribed, Fowler's solution being preferred; and since it deteriorates on keeping, its dismissal from the pharmacopœia is advocated. Mr. Ebert, however, stated that in his locality the solution is frequently prescribed.

A simple ureameter was described in a paper by Prof. L. E. Sayre; the construction of the apparatus is simple and inexpensive.

Cantharidin in Pharmacy.—Professor F. A. Grazer suggests that cantharidal collodion be made with cantharidin. For this and other purposes it may be easily and cheaply prepared sufficiently pure by every pharmacist, following Procter's process of exhausting the powder with chloroform, recovering the solvent by distillation, and removing the fat from the residue by carbon disulphide or petroleum benzin.

Syrup of Dextrin.—The pharmaceutical uses of the syrup which is commercially known as "glucose" were discussed in a paper by Mr. F. A. Rometch. The legitimate use in pharmacy was stated to be limited. A dense syrup known as "mixing glucose" (specific gravity about 1·40) is useful for suspending oils, resinous substances, powders, etc. Mixed with syrup of gum it is useful for many pill masses and will prevent the pills from becoming too dry. It is a protective agent for ferrous iodide and for hydriodic acid and has some advantages when used with the hypophosphites. For soda water syrups it should be used rather sparingly, say in the proportion of one part to three or four parts of cane sugar syrup. Mr. Ebert thought this syrup of dextrin could be utilized also in other ways, provided it was free from sulphurous acid and sulphites, which are present in some commercial articles as preservatives. Glucose cannot be used for adulterating cane sugar without forming a solid mass. Messrs. Calvert, Hallberg and Searby participated in the discussion.

Relative value of various pepsin tests, by F. A. Thompson. The paper was read by title and referred to the publication committee. It compares the results obtained with the methods directed by the U. S. and the British Pharmacopœias, the National Formulary and with several modifications. The author favors complete solution of a definite amount of coagulated albumen as the requirement.

Commercial Belladonna root.—Thirty-five samples, including the ground and powdered root, were assayed by W. Simonson, who found the total amount of alkaloid to vary between 0·220 and 0·776 per cent. In view of the variable quality an authoritative standard of value in alkaloid, at least for the lower limit, is very desirable. Referring to such great variations in the alkaloidal strength of such a powerful drug, Mr. Calvert suggested that the inaccuracies resulting from the use of weights and measures were quite insignificant.

Hypophosphorous acid and ferrous solutions were reported on by Mr. John Devine. The acid was found unsuitable as a preservative for solutions of alkaloids; but ferrous solutions were kept unchanged, a temperature of 70° F. being better than 60°, and concentrated solutions kept best, even with a relatively smaller amount of the acid. As to the mode of action, the author suggested that possibly the hypophosphorous acid might be converted into phosphinic acid or an ether. Prof. Maisch expressed the hope that the author might succeed in proving such a change to take place; he also stated that, without the addition of a preservative agent, syrup of ferrous iodide prepared with hot simple syrup kept well in consequence of the formation of invert sugar. Mr. Ebert had also observed that pure cane sugar would not prevent decomposition, but that invert sugar would do it. Mr. Redsecker had experienced no trouble in keeping this syrup unaltered in large bottles with the addition of a little hypophosphorous acid. Mr. Ray's experience coincided with this. Prof. Searby suggested that the acid might have this preservative action by inverting the sugar.

Compound Galenical Preparations.—Prof. Remington arrives at the conclusion that all compound galenical preparations which have not thoroughly established their usefulness throughout the country, should be dropped from the next revision of the United States Pharmacopœia; and that none should be admitted to that authority except such as will stand the same test of extended usefulness; and if admitted, the processes must commend themselves to the practical worker as models of simplicity and elegance.

Chinese Extract of Opium.—Mr. John Calvert has observed the process of manufacturing this extract as followed by the Chinese experts in San Francisco; it is as follows:

The quantity of opium operated upon, so that a workman can do a fair day's work, is usually about 16 or 18 pounds. The balls are placed in tepid water to soften the surface, and they are washed by hand to remove grit, leaves and other foreign substances. The material is then placed in a shallow concave brass pan, which is kept gently heated over the naked charcoal fire, and by means of the wooden pestle, is kneaded into a soft paste. When homogeneous, the softened opium is uniformly spread over the inner surface of the pan, and patted down by the hand, so as to give it a smooth surface. The heat is continued until the greater part of the moisture has evaporated, and the opium has become so solid that the pan can be turned over. The direct heat of a very small fire is now allowed to act directly on the face of the opium by turning the pan upside down. This has to be carefully and skillfully done. As soon as the surface of the material has become sufficiently hardened, it is deftly removed in thin layers, and this is continued until all the opium has been taken from the pan, except the dried portion which remains attached to the bottom and sides of the vessel. This is scraped off.

The crusts which were laid aside in the former operation are now put on a gridiron a few at a time, with the greatest care, to avoid breaking them, and are toasted over the charcoal at a low temperature until they have become perfectly crisp. The crusts are then placed in one of the brass pans, covered with warm water, and left standing until the next morning.

On resuming work the infusion is drawn off into buckets through baskets lined with muslin strainers.

The brass pan is slightly tilted, and by means of a knot of vegetable fibre the liquor is drawn off over the edge of the pan without loss. The roasted opium is drained, and a second quantity of warm water added, with as little breakage of the crusts as possible, and the extraction is finished with a third lot of water. Only the first and second infusions are used for the extract; the washings and weak infusion are employed for the extraction of the next batch. There seems to be no precise rule as to the quantity of water for making the infusion, the crusts are merely covered.

The infusion is then mixed with some egg albumen and a part of it is placed in the largest of the brass pans over the naked charcoal fire, and is heated, skimmed and boiled constantly. The pan is not filled, but room is allowed for frothing, and fresh portions of warm infusion containing albumen are added from time to time as the bulk diminishes. During the boiling there are several matters to be attended to, such as keeping up the fire, or banking it up with ashes if too hot, prevention of boiling over by addition of small quantities of the infusion, or of water, and keeping the sides of the pan free from hardened extract. This is effected by water and by fiber scrubbing brushes. When all the infusion has been added, and the evaporation has proceeded as far as is considered to be necessary, the pan is removed from the fire, and the extract constantly stirred by means of a wooden spatula in a current of air produced by fanning until cool and uniformly mixed.

The yield of extract varies according to the kind and quality of opium. Eighteen pounds of first quality Turkey Opium generally yield about ten pounds of this extract.

The greatest watchfulness is exercised over the roasting or toasting part of the process. Although a small exposed corner of the crusts may become charred occasionally, the object of this operation is to expose the opium to such a heat only, as to render it porous, to do away with the quality of stickiness, which is said by some authors to be produced by an easily decomposed caoutchouc like substance, and to allow the aqueous extractive matter to ooze out of the material without stirring.

Notwithstanding the constant repetition of cautions in all the text-books, dispensatories and other pharmaceutical literature respecting the care to be observed about subjecting opium to heat, I do not find that there is any appreciable difference in the yield of morphia when opium has gone through this barbarous process. Whatever changes may take place among the other proximate constituents is not known, but I am quite satisfied as to the fact that the natural morphia salts, protected by extractive, are not decomposed, or only to a very small extent, by such a heat as is necessary for the desired alteration of the valueless or inert matters contained in Opium.

The discussion brought out the facts that some of the extracts used by the Chinese for smoking contain little or no morphine, and that the effects are probably not mainly due to the amount of morphine present.

How to Conduct a Quiz Class is the title of a paper read by Prof. Whelpley, which is not adapted for being abstracted.

Maize Oil.—Two papers were presented by G. W. Kennedy and by C. A. Heinitsh. Attention having been directed to this oil by Mr. Lloyd (AMER. JOUR. PHAR., 1888, p. 325), the two essays furnish further evidence regarding the applicability of maize oil to pharmaceutic uses in the preparation of liniments, ointments and plasters. It was stated that at present much of this oil was sold as a substitute for olive oil, taking the place of cotton seed oil.

Morrhuol.—By digesting cod liver oil with alcohol, S. A. McDonnell obtained, on evaporation, 3·5 per cent. of extract; no information could be given as to its therapeutic value.

Oleate of Morphine, 10 per cent. strength, may be extemporaneously prepared according to S. A. McDonnell, by heating on a water bath 450 gr. oleic acid with 53 gr. morphine sulphate and adding gradually 25 minims of concentrated ammonia water, stirring constantly until a perfect solution takes place.

Reaction of Some New Remedies.—S. A. McDonnell applied the concentrated acids of the shops and tincture of ferric chloride to sulphonal. salol and acetanilid which produced no change. Phenacetin was colored yellow by nitric acid; the acid is added to the aqueous solution and the mixture heated to boiling. Antipyrine is colored blood red by tincture of ferric chloride.

A Pointer in Dispensing.—S. F. Hughes, receiving a prescription for ung. hydrarg. ℥i to be divided into twenty papers, dispensed it by rolling out the ointment like a pill mass, using lycopodium on the pill.

Oil in ground Flaxseed.—Seven samples of flaxseed meal obtained in the Chicago market when exhausted with carbon bisulphide, were found by W. A. Puckner to yield from 36·12 to 37·98 per cent. of fixed oil. (See also AMER. JOUR. PHARM., 1887, p. 286 and 601.)

Division of Powders.—The paper presented by Prof. E. B. Stuart and E. B. Tainter of Chicago, gives the results of experiments made by 37 dispensers with three prescriptions and shows the variations in the total weight and in the weights of the powders dispensed in the ordinary way.

Fabiana imbricata.—M. Rockwell examined the drug microscopically, furnishing a drawing of the transverse section, and chemically, the constituents found being an alkaloid, two resins, a fluorescent compound, a glucoside, a tasteless crystalline compound and volatile oil. (See two papers on constituents of Fabiana in present number.)

Tincture of Boletus laricis.—A patient investigation of a difficult subject, by C. W. Phillips. The paper, which cannot be well abstracted, gives the experiments made with the view of ascertaining the nature of the precipitate occurring in the tincture; the literature regarding composition, and processes for separating the important constituents. A large number (44) specimens were shown in illustration of the subject matter. The author states that if the cathartic effect of boletus is desired a tincture of the red resin would be a proper preparation; but if the anti-diaphoretic effect be desired, it is suggested that the pure agaric acid be used, or a saturated solution of the acid, of which ten to twenty minims would contain a full dose. (See also AMER. JOUR. PHARM., 1889, p. 253.)

Preparations for the Skin.—A paper by F. B. Kilmer treated of the various agents and vehicles used for external medication. The substance named *oleite* was particularly dwelled upon as a suitable base for many purposes. It is a soda soap of sulphoricinoleic acid, prepared by treating castor oil with sulphuric acid at a moderate temperature, washing with water, then with ether and finally neutralizing the remaining substance with soda. *Gelatoles* are ointments made by dissolving the drug in oleite, combining with a suitable base which if fatty is partly saponified, adding an absorbent for water if required, and finally gelatin to give consistency.

The poisonous plants of California was a valuable contribution by Prof. H. H. Behr, enumerating plants, indigenous and introduced, which are either poisonous or suspicious.

The red coloring matters of the scarlet geranium have been studied by Prof. Wenzell, and one of these principles was obtained crystallized. The species used was Pelargonium zonale.

Bitter waters were discussed by Dr. Enno Sander; the variations in the composition of natural waters and the differences in composition of some bottled waters furnished good arguments for artificial carbonated bitter waters of definite and unvarying composition.

Picrotoxin in beer was the rather startling title of a paper by S. F. Hughes. After considerable discussion about the various charges of adulterations practised with fermented and malt liquors, it was stated by Prof. Wenzell that picrotoxin had been found only in a cheap variety, commonly called steam beer in San Francisco, and that the higher grades of beer had all been free from this adulteration. The small amount of Cocculus indicus formerly imported into this country was cited as a proof that it could not be used for such a purpose to any extent; but those present could give no definite information as to the amount of cocculus imported of late years.

The Pines of California was the subject of an interesting paper contributed by Mr. Jas. G. Steele, describing the eighteen Californian species of Pinus according to characters, distribution and uses.

The reading of the papers being finished, a vote of thanks was given to the retiring chairman, and the newly elected chairman, Prof. H. M. Whelpley, took his seat. Mr. Chas. F. Dare, of Bridgeton, N. J., is the secretary of the section for the ensuing year, and Prof. J. M. Good, of St. Louis, the third member of the committee. A report was presented by the committee on the chairman's address, and some rules were adopted regulating the order of business. The Section then adjourned.

Section on Pharmaceutical Education.—The chairman, Prof. Bedford, presided, and Prof. A. B. Stevens was appointed secretary. In the chairman's address the necessity of pharmaceutical education was dwelled upon, and that this is recognized was shown by the number of educational institutions, there being 20 colleges and 12 schools of pharmacy located in 17 states, the District of Columbia and Canada; also by the legislation regulating the practice of pharmacy, 33 of the states and the District of Columbia having pharmacy laws, while one (Maryland) had a local law, and the remaining 14 states and territories were still without legal enactments on the practice of pharmacy. The number of graduates in pharmacy actually engaged in the business was estimated at 4000; about 2000 are supposed to have attended instruction without graduating, while the total number of stores where medicines are sold or dispensed, was estimated to be 38,000, with fully 75,000 persons engaged in them. The total attendance at the pharmaceutical institutions during the past year was about 2700 only. Reading alone, it was stated, would never give the kind of information usually retained; the lectures, instructions, laboratories and museums of the colleges bring together that which the student cannot otherwise procure, and for which the expense to him is but trifling compared to the benefit he may derive if he will. Among the subjects for consideration the chairman suggested are the following: 1. What is the duty of the fraternity towards our educational institutions? 2. What suggestions can be advanced to better the methods of teaching at present employed? 3. What can be done to secure more interest in, and larger classes for educational advantages?

The Committee on preliminary examinations presented a report which was well received. The report argued that the colleges were designed to do the greatest good to the largest number; that in the admission of students a middle course must be pursued; that many youths enter the drug business from sheer listlessness or without proper conception of the intellectual capacity and mental training necessary; that the proprietors of stores are largely responsible for taking learners without sufficient inquiry into their scholarship; that the educational qualifications exacted of apprentices are closely allied to those exacted for admission to the colleges, and that it is much easier to exact conditions before a youth enters upon his apprenticeship, than several years afterwards. The recommendations of the report were:

1. That this association recommend its members and all others in the retail drug business to refuse to take into their employ as apprentices or learners any boys or young men who have not been graduated from a grammar school of their respective states, or who do not present evidence of having received an education equal to that required for such graduation.
2. That colleges of pharmacy demand as a condition to entrance upon their courses of instruction a certificate of graduation from a State grammar school, or from an institution whose course of instruction is known to them to equal that of the State grammar schools, and whose requirements for graduation are not less stringent.
3. That irrespective of the possession of a diploma from a grammar school, all applicants be examined in the following branches: English composition, percentage, proportion and rudimentary Latin. (This recommendation is made because of the differences in the courses of instruction in the public schools in

different states, and in view of the fact that experience has taught us that many of the candidates have left school for some years and forgotten what they had only imperfectly learned.)

4. In the absence of such grammar-school diploma the prelimary examinations should embrace:—

(*a*) A thorough examination in the English language, including orthography (chirography), use of capital letters, punctuation, grammatical construction.

(*b*) Mathematics, common and decimal fractions, percentage, proportion, involution and evolution and denominate numbers.

(*c*) Geography and rudimentary Latin.

5. That all colleges announce that in the year 1891 they will require the candidates to pass an examination in algebra in addition to the foregoing.

A paper by Prof. L. E. Sayre on *training in Latin* was read; it recommended, instead of a strictly philological course, a series of exercises on subjects directly connected with the drug business.

A paper on *theoretical and practical training* by Prof. Remington, arrived at the conclusion that it is better for the student to have practical experience before entering college, better for the professors, (because of the greater intelligence of the students), better for the college, (because it makes better students), and better for the community (for the the same reason); but it was acknowledged that there may be an exceptional case here and there which would require special consideration, and the ultimate object of the student might not be the usual one, that of becoming a retail pharmacist.

The paper created some discussion, Prof. Stevens arguing in favor of the training in the sciences appertaining to pharmacy previous to entering upon the drug business; but the other speakers preferred the course recommended in the paper.

Several papers were presented, and being considered unsuitable for publication in the Proceedings, were laid upon the table.

A suggestion was made that each section prepare for the members some questions, the answers to be brought before the proper section.

Mr. Hallberg spoke of the injury done to the cause of education by colleges having two courses of instruction during the year, and graduating students within one year, or after having attended two such consecutive courses. Several members coincided with the views expressed, and it was understood that at the meeting next year the subjects should be fully discussed and acted upon.

The officers of the section for the ensuing year are, Prof. Bedford, chairman; Prof. Stevens, secretary, and Mr. H. M. Whitney, of Lawrence, Mass.

Section of Pharmaceutical Legislation.—In the absence of the members of the committee, Mr. Emlen Painter was appointed chairman, and J. M. Maisch, secretary.

A letter was read from C. W. Day explaining his absence and advising the formulation of a plan for the interchange of certificates of registration by state boards of pharmacy. Mr. Manning moved that a committee be appointed for this purpose, but stated that the motion was made at the request of a member of the Association, and that he was not in sympathy with it. After considerable discussion the motion was defeated by a unanimous vote.

A paper advocating a similar course, was presented and laid upon the table.

A paper by Dr. Eccles on "The Aim of Examinations by Boards of Pharmacy" was ordered to be printed.

A letter from C. E. Reynolds, Apothecary, U. S. Navy, was read, inclosing the draft of a bill for the granting of a warrant to the Apothecaries of the Navy. The chairman and secretary of the section were duly authorized to memorialize Congress in favor of the bill.

Attention was called to the fact that for two years the Committee on Legislation had neglected to report the newly enacted or amended pharmacy laws for publication in the Proceedings. The committee to be appointed was instructed to collect them, as far as possible, for publication in the next volume, and to report others next year.

The Committee on Pharmaceutical Legislation for the ensuing year is the same as that for the preceding section, and consists of Messrs. P. W. Bedford, A. B. Stevens and H. M. Whitney.

The final session of the Association took place on Friday morning, June 28th. After the reading of the minutes of the preceding sessions and of the Council, the report on the president's address was received and the following resolutions were adopted :

1. That the Council be directed to practice rigid economy in regard to expenditures and appropriations until our indebtedness is paid and we have accumulated a surplus of at least $2000.
2. That the Secretary be directed to devote a page in each volume of our published Proceedings to the "Ebert," the "Centennial" and the "Life Membership" funds, and that upon this page shall be printed a brief history of the origin, money value and use to which the proceeds of each fund may be applied.

Mr. Simmon moved an amendment to the by-laws with the object of consolidating the sections on education and legislation. The subject lies over until next year.

Mr. Chas. E. Dohme, of Baltimore, was elected local secretary, and Mr. J. H. Redsecker, of Lebanon, Pa., a member of Council in the place of Mr. Painter.

Mr. Eliel moved that hereafter the printing of the papers for use at the meetings be discontinued; but accepted an amendment offered by Mr. Simmon, which was adopted, that the cost of printing should not exceed $100.

The installation of officers was then proceeded with. Secretary Maisch stated that the office of permanent secretary was first created in 1865, when he was nominated for this position without his knowledge ; that he resigned in 1869, but was subsequently induced to withdraw his resignation; that now, having been elected for the twenty-fifth year, he considered it but just to himself and the Association to present his resignation, to take effect next year.

Votes of thanks were passed to the retiring officers, the local secretary, the druggists of the Pacific slope, their wives and ladies, the daily press, and to the citizens in general.

The president was empowered to appoint three delegates to the national convention for the revision of the U. S. Pharmacopœia; also a committee of five on Arrangements, of which the Local Secretary shall be chairman ; this committee to be also the Committee on Entertainments.

The Association then adjourned, to meet again at Old Point Comfort, Va., on the second Monday of September, 1890.

The Excursions and Entertainments, in connection with the thirty-seventh annual meeting of the American Pharmaceutical Association, were of the most enjoyable nature, and will long be remembered by those who were present. As previously announced two excursion parties from the East had been arranged for, one starting from St. Louis by way of Kansas City and through Kansas reaching Denver Sunday morning, June 16. The other party left Chicago somewhat later than contemplated, and passing through Iowa and Nebraska, arrived at Denver on Sunday afternoon. The druggists of Denver and of adjacent parts of Colorado met the visitors on Sunday evening at the St. James Hotel, where an informal reception was held, and conducted them afterward to Trinity Methodist Church where a recital on the grand organ was given for their entertainment. On Monday a complimentary excursion was tendered to the visitors up Clear Creek Cañon to Silver Plume, and was thoroughly enjoyed by all.

On Tuesday the two excursion parties separated again, one going by way of Cheyenne and Ogden directly to Salt Lake City, and after spending there a couple of days, to San Francisco. The other party tarried until Thursday morning at Manitou and Colorado Springs, visiting the different springs, falls, cañons and caves, and then journeyed over the picturesque Denver and Rio Grande road through the Royal Gorge of the Arkansas, over Marshall pass (10850 feet altitude), the cañon of the Gunnison, the plains of Western Colorado and the desert of Eastern Utah to Salt Lake, thence westward through Nevada, crossing the Sierra Nevada, to San Francisco.

The entertainments planned at the place of meeting by the druggists of San Francisco and of the Pacific Coast, commenced on Monday evening June 24 with a grand reception and promenade concert at the Palace Hotel, which was the head-quarters of the Association during the week. The parlor floor of this mammoth structure was especially reserved for this occasion.

On Tuesday afternoon the resident ladies met in the reception parlors of the Pacific Hotel to act as escorts to the visiting ladies to the panorama of the Battle of Vicksburg and through Chinatown. Wednesday morning was again set aside for the enjoyment of the ladies; the route of the carriage drive was through the U. S. Reservation and Presidio, and through Golden Gate Park to the Cliff House, where the famous seal rocks were viewed, the return trip being through the park. Thursday morning Sutro Heights were visited, via the scenic route of the Park and Ocean Railroad, a magnificent view being afforded of the Pacific Ocean.

A banquet was given at the Palace Hotel on Wednesday evening, the hall and the tables being elegantly decorated. Dr. S. H. Melvin, president of the California College of Pharmacy, presided. A number of toasts were proposed and responded to, and a surprise was in store for the hosts when President Alexander presented to the College, on behalf of Prof. Runyon, a well executed portrait of Emlen Painter, formerly one of the professors of the College, and now a visitor to the city and the president-elect of the national association. The evening's entertainment closed with dancing in the parlors of the hotel and promenading in the corridors.

Thursday evening was devoted to a visit to Chinatown. Theatres, bazaars, restaurants, private houses, etc., were inspected under the guidance of trusted and experienced leaders.

After adjournment, on Friday afternoon, a visit was paid to Oakland, where the local druggists took charge of the visitors, and showed them the city and its surroundings. Lake Merritt, Pleasant Valley, the Sulphur Springs and many other places of interest were visited, the day closing with a banquet at Tubbs Hotel, where brief speeches were made by a number of members previous to final adjournment.

Saturday morning closed the week's entertainments with an excursion around the Bay of San Francisco, on board the steamer James M. Donohue. The route was around Alcatrez Island to the Presidio, Fort Point, the Golden Gate, Saucelito, Raccoon Straits, Red Rock and past Oakland, Alameda and Hunter's Point. Shortly after two o'clock the landing was effected and after bidding their hosts good bye the visitors returned to the hotel, and a large number of them took the afternoon train for San José and for the Hotel del Monte, on the Bay of Monterey, where the Sunday was spent. The stately palms and cacti, the large live oaks and coniferous trees, the ancient town of Monterey, with its relics, the drive along the beaches, through cypress grove, etc., formed novel attractions for the visitors.

Monday, July 1st, was the day which found most of the visiting members engaged in making preparations for leaving hospitable San Francisco. A party of about fifteen made the journey to the famous Yosemite Valley with its towering rocks and grand waterfalls, took a look at the peaks of the Lyell group of the Sierra, and paid a visit to the big trees, *Sequoia gigantea*, in the Mariposa grove, where the famous "grizzly giant," the "wawona" (through which the stage passes), and many other forest giants have their home. Most of the members on their homeward journey went northward, passing Mount Shasta and through the Willamette valley, to Portland, Ore., and Tacoma, Wash. Excursions were made up the Columbia river, and on Puget Sound to Seattle and Victoria; and on the line of the Northern Pacific Railroad some stopped at Spokane Falls, Helena and other places, and then visited the Yellowstone National Park, with its numerous hot springs, active geysers, grand waterfalls and the magnificent and picturesque grand cañon.

Most of the Eastern members stopped for a day or two in Minneapolis, St. Paul and Chicago, and then returned to their homes, some having journeyed over 8,800 miles by railroad and about 300 miles by stage. It was a memorable trip for each one. Aside from the works erected by human hands, the varied scenery, the changes in climate, the strange flora, the native forests, the groves of tropical trees planted for timber or fruit, the extensive deserts, the broad and fertile valleys, the wild cañons, the snow-capped mountains and the natural wonders of Yosemite and of Yellowstone Park made impressions which can never be effaced from memory.

THE AMERICAN
JOURNAL OF PHARMACY.

SEPTEMBER, 1889.

THE ORIGIN OF FALSE SENEGA ROOT.

By John M. Maisch.

When in 1876 Mr. Wm. Saunders called attention to a suspicious senega root (*Proceed. Am. Phar. Assoc.*, 1876, p. 661), which afterwards became known as *white* and *false* senega, I stated my belief, that it came from a species of Polygala, though not from Pol. Senega. It disappeared from our market shortly afterwards (Proc. 1877, p. 525); but through the aid of the late W. H. Crawford, (Ibid. 1881, p. 522), I had been enabled to trace it to the neighborhood of Springfield, Mo., where it was said to have been collected. All subsequent efforts to ascertain the locality of collection, or to procure a living plant with root attached proved of no avail, though from time to time the same root was met with in commerce. In 1881 (*Amer. Jour. Phar.*, 1881, p. 388), on receiving from Dr. J. H. Gunn, of Alabama, a specimen of Polygala Boykinii, *Nuttall,* I regarded it as the parent plant of the false senega, notwithstanding most of the latter roots were larger in dimensions than the root of the plant received.

The white senega, examined microscopically by Thos. Greenish, (*Phar. Jour.* and *Tr.*, Sept. 7, 1873 ; *Am. Jour. Phar.*, 1873, p. 523) was believed by him to be a true senega; but Geo. Goebel (*A. Jour. Ph.*, 1881, p. 322) pointed out some striking structural and chemical differences.

That this white keelless root is derived from Polygala Senega has been maintained by many dealers; and this belief has doubtless been strengthened by papers on commercial senega by J. U. and C. G. Lloyd, who have made a special study of the indigenous medicinal plants. In *Proc. Am. Phar. A.*, 1881, p. 453, and in *Phar. Rundschau*, New York, 1889, p. 86, they describe the different commercial varieties of (southern or western, and northern) senega, all of which are stated to come from the typical form and several varieties of Pol. Senega. In one of these papers (1881) it is stated that "Polygala Boykinii is the only native species that, to our knowledge, approaches in size the Pol. Senega;" and in the other (1889) that "continued inquiries regarding the root of Pol. Boykinii have led to completely negative results; not a single commercial lot of senega from the southern states contained that root." Prof. Chas. Mohr of Mobile, who is well acquainted with the flora of the southern states, has shown (*Phar. Rundschau,* 1889, p. 191) that the distribution of the two species is such, that an accidental intermixture of the two roots is impossible, and that the root of P. Boykinii cannot be collected in such a quantity and at a price as to become an article of commerce. (Ibid. p. 89).

While it is possible that white or false senega may occasionally be found as an admixture of officinal senega, I cannot make such a statement from personal observation; but have not doubted the difference in the botanical origin of the two roots, as I had occasion to state quite recently (Am. Jour. Phar., 1889, p. 381). The papers just quoted seem to render untenable my belief in the origin of the false root from *P. Boykinii;* but I am pleased to be able now to definitely identify the species yielding it.

Quite recently Messrs. Peek & Velsor, of New York City, sent me a plant, which on examination seemed to be *Polygala alba, Nuttall;* the root to which the numerous stems are attached is fully four inches in length and, beneath the crown, one-fourth inch in diameter. On comparing it with a number of specimens in several herbaria, the roots of the latter, when present, were found to be considerably smaller, more slender and less branched. The resemblance of the specimen with senega root, notwithstanding the absence of the keel, suggested the plant possibly to be a variety of the latter species with linear leaves; but the narrow-leaved specimens of true senega were observed to differ essentially in the root, leaves and flowers. Not having the means to remove every doubt, it was deemed advisable to consult some of the best judges of the flora of the western states.

In one of the letters Messrs. Peek & Velsor wrote as follows: "The shipper informs us that it is gathered in Kansas and that a few bales every year have passed through his hands to dealers and manufacturers, and that there had never before been any question as to its being Polygala Senega until we refused it."

In regard to the specimen plant, Professor Sereno Watson writes: "The Polygala sent must be *P. alba*, the root of which varies considerably in its character." Professor Thos. C. Porter writes: "The Kansas Polygala has all the characters of *P. alba*, Nuttall. In the specimens of our herbarium, from a number of widely different stations, some have roots fully as large as that of yours. The species is somewhat variable and includes *P. Beyrichii*, T. & G."

The original description of the plant as given by Nuttall in 1818 (*Genera of the North American Plants, II*, p. 87), is as follows: *P. alba.* Perennial; flowers cristate; stem simple; leaves alternate, linear, revolute on the margin; flowers racemosely spiked; spike long pedunculate, bracts deciduous; wings of the calyx rounded, about the length of the corolla. Hab.: On the plains of the Missouri, common, and the only species of the genus in the upper part of Louisiana. Obs.: A small plant scarcely more than six inches high, considerably allied to *P. Senega*, but more than a variety, as it has been considered by Mr. Pursh; leaves smooth and narrow; flowers and calyx white, nearly sessile; bracts lanceolate.

Some additional characters, giving also some of the variations of the plant, are copied from other works, namely:

Stems several from a somewhat woody root, erect or ascending, angular, at length branched above; leaves linear, narrowed towards the base, acute, or the lower ones obtuse. Stems ½ to 1 foot high. Spikes 1 to 3 inches long.—Chapman, *Flora of the Southern United States.*

Leaves linear to oblanceolate, sessile or barely petioled, margins slightly revolute; stem leafy half way to the summit; flowers deciduous, leaving the rachis roughened after their fall.—Rothrock, *Geographical survey west of the* 100*th meridian; VI, Botany.*

The lower leaves are often distinctly verticillate.—Sereno Watson, *Procs. Amer. Acad. of Arts and Sciences*, XVII (1882), p. 325.

It will be observed that Pursh regarded the plant merely as a variety of *P. Senega*, and that Nuttall, in 1818, pointed out its near relation to the latter species. Twenty years later, Torrey and Gray stated (*Flora of North America*, I, 131): "We have not seen this plant, but we suspect that it is a variety of *P. Senega*." Since the resemblance extends also to the root, the latter was most likely originally collected in good faith and sold as senega; and after the difference between the two roots had been pointed out, the opinion as to identity was probably adhered to without showing the plant to a botanist.

I append here the diagnostical characters of *P. Beyrichii* as given by Torrey and Gray (*loc. cit.*), and which are in part included in some of the quotations above: Spike dense, acute, flowers on very short pedicels; wings orbicular-obovate, concave, rather longer than the broadly obovate lateral petals; capsule oblong; seed very villous with appressed hairs; lobes of the caruncle distant, about half as long as the seed; stems numerous, somewhat branched; leaves linear or linear-spatulate, somewhat glandular.

Regarding the distribution of this species, Nuttall states that it is common "on the plains of the Missouri" and "in the upper part of Louisiana." Nuttall had explored the country along the Missouri river in 1810, when the territory of Louisiana extended northward to the British possessions. From these northern plains the species extends southward to Texas and into Mexico. Rothrock's specimens were collected in Arizona at an altitude of over 7,000 feet; and Watson's remarks quoted above refer to plants coming from several Mexican states.

It is but natural to expect considerable variation in a plant indigenous to such a large portion of the North American continent, and that these variations should apply not only to the size and shape of the stem and leaves, but likewise to the underground portion. Many of the Mexican plants in herbaria agree very well (root excepted) with the Kansas plant in my possession which has occasioned the present investigation; still other Mexican plants have been observed as *Pol. alba*, in which the inflorescence was decidedly thicker, more conical and less acute than in the other forms from Texas and farther north.

For a sample of this false senega root from Kansas I am indebted to Messrs. Peek & Velsor; it is of the same handsome light color as the false senega of 1876, and agrees in all essential characters with the false senega root seen since then, except that some of these samples are somewhat darker in color; but I have never seen it as deep brown in shade as the much larger northern senega, which has been in commerce for about ten years or more. The following description of the sample before me applies, therefore, with the variation mentioned, to all the samples seen during the past thirteen years.

Commercial false senega consists of but little broken roots, the total length of which varies between four and six inches. The head has a close resemblance to that found in senega root, is about five-eighths inch, sometimes an inch, in thickness, and bears above a large number of stem remnants. Beneath the head the root is suddenly contracted to the thickness of about one-fourth inch; a few small roots may usually be picked out, scarcely one-eighth inch in thickness, while some larger roots are three-eighths, or rarely one-half, inch thick. The color is pale brownish-yellow, much lighter than commercial senega is usually seen, and lighter than all other officinal roots, the white ones excepted; since the interior of the root, both bark and meditullium, is of a nearly white color, it is obvious that in bulk the color of false senega root must have a still lighter tint, approaching to white, in proportion to the abrasion of the outer layer. Older roots, particularly near the head, have a thin layer of cork of about the same shade of brown as gentian. The main root is nearly straight, and the six or eight thinner branches are descending or curved down-

---

ERRATA.

Page 453, line 5 from bottom, for "microscopical" read "macroscopical."

---

the same portion of the northern senega has a

decidedly acrid taste.

The small roots in the sample agree well with *P. Boykinii;* but this species not growing in Kansas cannot be present in the sample under consideration. A histological investigation of the material on hand is contemplated, and it is hoped may reveal differences in addition to the microscopical characters pointed out. Not having seen the southern senega, of which Prof. Lloyd has handled some bales, and which was of excellent quality, but without any observable keel (*loc. cit.*, p. 88), I cannot say whether or not it was identical with false senega; but it should be noted that thus far the latter is not known to come from a southern state; the only two localities, as yet ascertained, have been pointed out by me, viz., southwestern Missouri and Kansas.

TINCTURE OF STROPHANTHUS.

By George M. Beringer, Ph. G.

The reading of Dr. E. R. Squibb's recent article on this subject (in *Ephemeris*, page 1252), recalled to my mind a few simple experiments tried about a year or so ago. As the results may possibly be of value to others I desire to here record them. As this preparation will most likely be an addition to the Pharmacopœia at the next revision, it seems desirable that all information and formulas should be placed at the disposal of the Committee on Revision. To that end, I am constrained to briefly review the salient points of the literature bearing on this subject.

The tincture as originally proposed by Prof. Fraser in 1885 was one ounce avoirdupois of the seed in eight fluidounces of tincture. It was afterwards shown by W. Martindale that this amount of menstruum did not nearly extract the drug and he suggested to make the tincture one ounce avoirdupois to the imperial pint of twenty fluidounces. This strength 1 to 20 has since been accepted by Prof. Fraser, Wm. Elborne, H. Helbing and I believe by all other investigators and adopted by the British Pharmaceutical Conference. The following is the formula of the Unofficial Formulary:

TINCTURA STROPHANTHI (TINCTURE OF STROPHANTHUS).

Take of

Strophanthus Seeds, reduced to No. 30 powder and dried at 110°F......1 oz.

Pack in a percolator, and moisten with pure ether (sp. gr. 720). Macerate for twenty-four hours, then allow the percolation to proceed, continuing the addition of ether, until the fluid passes through colorless, (about eight or ten fluidounces suffice). Remove the marc from the percolator, and dry it, gradually heating it to 120°F. Again reduce it to powder, repack in the percolator, and moisten with rectified spirit. Macerate for forty-eight hours, then pour on successive quantities of spirit, percolating slowly, until one pint of tincture is obtained. Dose—2 to 10 minims. (*Year Book of Pharmacy*, 1888, 475.)

Dr. Squibb now proposes to prepare the tincture by the following process:

Clean well dried strophanthus seed	256 parts.
Broken glass	128 parts.

Stronger ether, (Sp. gr., 725 at 15·6°C).
Menstruum of 2 parts alcohol and 1 part water or alcohol of 62 per cent.; of each a sufficient quantity.

The seed and glass are ground together, the powder spread out thinly and dried at 110° F. Then pack it tightly in a percolator and percolate with ether until free from oil. The ether is then recovered by distillation. The powder is again spread out, dried and weighed, and *this weight* plus the weight of the oil is to be taken as the weight of the seed upon which to adjust the yield of tincture. Repack the percolator and percolate it slowly until 84 parts of tincture are obtained for every five parts of dry seed. (*Ephemeris*, July, p. 1252.)

There are several new features introduced in this formula worthy of comment. Dr. Squibb makes a calculation "to convert the British relation of one avoirdupois ounce to twenty British fluidounces—or of weight to measure—to the more accurate and convenient relation of the U. S. P., of weight to weight." The result of this calculation the Doctor states in the odd proportion of 5 parts of the seed to 84 parts of the tincture. This calculation is based on the assumption that because an alcohol of sp. gr. ·8914 produces a tincture of ·8931 sp. gr. a tincture of ·840 sp. gr. would be produced by rectified spirits B. P. ·838 sp. gr. This assumption is more apt to be erroneous than correct. The truth most probably is that different samples of seed will yield various percentages of extract to alcohol, and certainly the same seed will yield a larger percentage as the proportion of water is increased. In confirmation, I would call attention to the results of H. Helbing (*Phar. Jour. and Trans.*, March 12, 1887, p. 747). "A tincture prepared with rectified spirits has the sp. gr. ·840 and a fluidounce yields about 120 mgm. of residue on evaporation. Three commercial samples had nearly the same density, but yielded respectively 88, 124 and 180 mgm. of residue. Four other tinctures were probably made with a weaker alcohol, were of a green or yellow color, varied between ·870 and ·900 in density and yielded from 170 to 242 mgm. of residue." (See AM. JOUR. PHAR., 1887, p. 425.)

It seems to me that it would be better for us to at once adopt a strength of 5 per cent., 1 part of the dried and powdered seed to 20 parts by weight of the finished tincture. The necessity for absolutely conforming to the British formula in this country does not seem to be so imperative when we compare the strengths of some of the poisonous tinctures of the U. S. and Br. Pharmacopœias.

Tr. Aconiti, U. S. P., is 40 per cent. Br. Ph. is 1 oz. to 8 fl. ozs.

Tr. Belladonnæ, U. S. P., is 15 per cent. Br. Ph. is 1 oz. to 20 fl. ozs.

Tr. Iodi, U. S. P., is 8 per cent. Br. Ph. is ½ oz. to 20 fl. ozs.

Tr. Veratri Viridis, U. S. P., is 50 per cent. Br. Ph. is 4 ozs. to 20 fl. ozs.

Tr. Opii, U. S. P., contains about 6 grs. of morphine to the fluidounce. Br. Ph. about 3·3 grains.

The second point on which we would comment is that Dr. Squibb recommends a second drying of the seeds after extraction with ether, stating that the powder then loses over five per cent. of weight additionally. He proposes to adjust the weight of the tincture to the weight of the seed after deducting this loss. As this second weighing has been omitted by all other writers, Dr. Squibb would make his tincture stronger to that extent.

Perhaps the most radical change proposed is the weakness of the alcoholic menstruum to be used (62 per cent). That rectified spirits would not entirely extract the bitter principle from the marc was proven by Mr. Wm. Elborne, who found "that the rectified spirit exhausted the seed of about 7·0 per cent. of extractive of an albuminous nature, leaving about 1·5 per cent. of the bitter principle in the marc, and that the loss of the latter would not be remedied by increasing the quantity of menstruum, due to the coagulating effect of the spirit exerted over a certain portion of the albumen with which that portion of the bitter principle was associated. By lowering the alcoholic strength of the menstruum it could readily be effected, yet not without the extraction of a corresponding large quantity of albuminous matter, which would prove highly objectionable, however, since the latter by over-dilution is on escape of the alcohol very prone to decomposition and develops a very fœtid odor.[1]—*Phar. Jour. and Trans.*, March 12, 1887.

My own experiments led me to adopt a menstruum of seven volumes of alcohol and one volume of water, yielding an alcohol of ·8530 specific gravity containing 78·52 per cent. of alcohol by weight, 84·27 per cent. by volume. A menstruum of this strength yields a tincture which after a year shows no sign of precipitation.

The sample of the seeds used in my experiments was of the Kombé variety. A quantity of the seeds were taken and pulverized and dried. This was now divided into two equal parts; the first packed in a percolator and thoroughly extracted with stronger ether. The ether was evaporated and yielded a residue of oil of 33·14 per cent.[1] A portion of the oil was agitated with dilute sulphuric acid. The acid liquid on separation had a decided bitter taste, and after boiling reduced Fehling's solution, showing that the ether had exerted a solvent action on the glucoside. This solvent power has been recognized by several writers on the subject and attributed to the small percentage of moisture remaining in the seeds or to the presence of alcohol or water in the ether. The difficulty of thoroughly drying the seeds at a temperature of 110° to 120°F. is shown by the second loss of weight, shown by Dr. Squibb to occur after extraction with ether. It is a fact well known to workers on plant analysis, and to which I believe Dragendorff originally called attention, that ether in the presence of oils exerts a solvent action on many substances especially of an alkaloidal nature, and to this cause I attribute the presence of glucoside in the oil extracted with ether.

---

[1] According to L. Larmuth, the bitter principle on being dissolved in water will in a few days undergo some change and become far more toxic than when recently prepared. (See AMER. JOUR. PHARM., 1887, 424). These statements would indicate that Tr. Strophanthus should not be prescribed in aqueous mixtures, a fact which I believe has generally been overlooked by the medical profession.

The powder was now removed from the percolator, dried, and then moistened slightly with a portion of the menstruum of seven volumes alcohol and one volume water, repacked in the percolator, macerated for forty-eight hours and percolated until twenty fluidounces of tincture were obtained for every ounce of powdered dry seed used. The resulting tincture had a sp. gr. of ·8535, and a fluidounce yielded 2·7 grains of residue on evaporation. The color was a very pale green and the tincture mixed with water without sediment.

The second portion of the powdered and dried seeds was packed in a percolator and treated with petroleum ether[2] until extracted. On evaporating this benzin solution 31·54 per cent. of oil was obtained. This oil treated with dilute sulphuric acid did not yield a bitter solution and the acid liquid when boiled and tested with Fehling's solution showed no reduction. The powder was then dried and percolated as was the first portion. The resulting tincture was of a pale green color, miscible with water, had a sp. gr. of ·85372 and a fluidounce yielded on evaporation a residue of 3·13 grains.

---

[1] The percentage of oil obtained by different investigators shows a very wide range. W. Martindale, using ether as a solvent, obtained 27 per cent. Helbing reports 32·45 per cent. Dr. Squibb states 23·45 per cent.; while W. Elborne, working with petroleum ether, reports 20·8 per cent., and A. W. Gerrard obtained 31 per cent., also using petroleum ether.

[2] The petroleum spirit selected for this experiment showed a sp. gr. of 0·6829 at 60° F. corresponding to a commercial gasolin of 75° B., was entirely volatile below 140° F., and gave no greasy stain on evaporation from filter paper, nor residue on allowing 50 cc. to evaporate in a tared platinum dish. Care must be exercised in the selection of a benzin for this purpose, as much of the commercial purified gasolins and benzins are of a sulphury character, having a foul odor, and are totally unfit for pharmaceutical or chemical purposes. The writer hopes to shortly be able to publish an easy process by which the pharmacist can purify these products, the experiments now not being completed.

As a result of the above experiments, I would suggest the following formula for the consideration of the Committee on Revision of the United States Pharmacopœia:

TINCTURA STROPHANTHI (TINCTURE OF STROPHANTHUS).

Take of

Strophanthus seeds, ground to a number 40 powder and dried at a temperature of 110 to 120° F..one troy ounce.
Benzin,
Alcohol,
Water; of each a sufficient quantity to make twenty fluidounces.

Pack the ground drug tightly in a cylindrical percolator and pour on benzin until the powder is saturated and the liquid begins to drop from the percolator, close the lower orifice and leaving a layer of an inch or more of the liquid above the powder, tightly cover the percolator and allow to macerate for twenty-four hours; then slowly percolate with the benzin until a few drops of the percolate evaporated from a watch-glass leave no oily residue. Then remove from the percolator, dry and, if necessary, again reduce to powder, moisten with a small portion of a menstruum of seven volumes of alcohol and one volume of water, repack lightly in the percolator and pour on menstruum, leaving an inch or two of supernatant liquid; cover the percolator and close the lower orifice and allow it to macerate for forty-eight hours, then percolate slowly, adding gradually menstruum of the above composition until twenty fluidounces are obtained.

If it be thought desirable to maintain the present system of percentage strength for tinctures, the amount of finished product would be altered to twenty troy ounces.

Acetanilid is considered by Dr. A. H. Newth a valuable adjunct to mercurials and other topical remedies. It was usually combined with lanolin or soft paraffin in the proportion of twenty grains to one ounce.—*The Lancet.*

HYPOPHOSPHOROUS ACID AND THE OFFICINAL HYPOPHOSPHITES.[1]

By Frank X. Moerk, Ph. G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 55.

III. HYPOPHOSPHOROUS ACID.

This acid which during the last few years has come into extensive use, while not officinal, has been introduced into the National Formulary where a new process of preparation is also given.

A number of processes of preparation have been published of which, however, only the first two mentioned appear to be used in its commercial production: The decomposition of calcium hypophosphite by either oxalic or sulphuric acid; the decomposition of barium hypophosphite by sulphuric acid; the decomposition of lead hypophosphite by hydrogen sulphide; and, finally, the process of the National Formulary in which potassium hypophosphite is decomposed by tartaric acid in presence of alcohol, which renders insoluble the acid tartrate of potassium formed in the reaction.

Two papers of interest in connection with this subject have been published: one by Mr. G. M. Beringer,[2] in which he compared specific gravities and results of neutralization of several commercial samples of hypophosphorous acid, sold as 50 per cent. acid, with an acid of this strength made by himself and which comparison proved the commercial acid to contain only from 33 to 40·5 per cent. acid; the other by Mr. Geo. Lunan,[3] in which a more extended investigation was made so as to include specific gravity, neutralization, reduction (by $HgCl_2$) and qualitative tests for calcium oxalate, free oxalic acid, calcium hypophosphite and phosphites; the reagents for the last test being acetic acid and lead acetate. No test for sulphate appears to have been made; hence, it is an open question if the one sample giving the above reaction really contained phosphite or if this was due to sulphate; the reduction and neutralization determinations agreeing these can not decide this point.

Four samples of commercial acid were procured, all sold as 50 per cent. No. 1 was at least six years old, the others were obtained at different times within the last eighteen months. They were submitted to the following tests:

---

[1] Continued from page 394.

[2] Amer. Journ. Phar., 1882, 100.

[3] Amer. Journ. Phar., 1887, p. 243; reprint from *Pharm. Journ. and Trans.*, 1887, p. 773.

Sulphuric acid by use of $BaCl_2$ and HCl.

Calcium oxalate by making slightly alkaline with ammonium hydrate, acidifying with acetic acid (to redissolve calcium phosphate) and filtering off the calcium oxalate; the filtrate is tested for

Calcium phosphate by rendering slightly alkaline with NH_4OH; an immediate flocculent precipitate indicating this salt. The filtrate from the $Ca_3(PO_4)_2$ is divided into two parts; one part is tested for

Other calcium salts (sulphate and hypophosphite) by addition of ammonium oxalate; the other part for free

Oxalic acid by adding calcium chloride.

Phosphorous acid was not tested for directly, but indirectly by noting the excessive acidity over the reducing value after allowing for an excess of calcium hypophosphite and any free acid (sulphuric or oxalic) which might be present.

The neutralizing power of the various samples was determined by weighing in a small glass-stoppered bottle from 2 to 5 gm. of the acid and afterwards rinsing the stopper and bottle until the acid was completely removed, adding a little phenolphthalein as indicator and titrating with normal NaOH. Mr. Lunan in the paper referred to used extraordinary precautions to prevent change of the indicator (methyl-orange) by the reducing properties of the acid; the conditions under which he titrated were extreme dilution and running the diluted acid from a burette into the dilute NaOH and indicator. A few experiments convinced me that these fears were groundless; the strong acid and a very diluted acid giving the same results on titration.

The reducing value was determined with about 0·5 gm. by either the mercuric chloride or bromine method (with the latter method the precautions on pages 332 and 387 must not be forgotten).

The results are expressed in parts in one hundred:

		I.	II.	III.	IV.
H_3PO_2	neutralization	32·76	32·76	38·22	44·76
	reduction	30·10	34·19	39·11	45·14
CaC_2O_4		——	——	0·36	0·71
$Ca_3(PO_4)_2$		——	0.11	——	——
H_2SO_4		2·69	trace	0·27	0·69
CaO from other Ca salts		0·38	0·71	0·80	0·68

It will be seen that only in No. 1 the acidity exceeds the reducing value, but this is found by the complete analysis to be due to an excess of sulphuric acid having been used in its preparation; the 0·38 CaO is the only basic constituent found, to neutralize which 0·66 H_2SO_4 is required, leaving an excess of 2·03 per cent. sulphuric acid, which in the original neutralization was expressed as 2·66 per cent. H_3PO_2, this being the excess of acidity over the reduction. As H_2SO_4 is dibasic and H_3PO_2 monobasic, one molecule of the former is equivalent to two molecules of the latter, and by the equation these 2·03 per cent. H_2SO_4 are equivalent to 2·72 per cent. H_3PO_2

$$\begin{array}{lll} H_2SO_4 & : & 2H_3PO_2 \\ 98 & : & 132 \quad :: 2{\cdot}03 : x = 2{\cdot}72 \text{ per cent.} \end{array}$$

These calculations prove the absence of phosphorous acid, although its presence was indicated by the relationship of the neutralization and reducing values; moreover, the sample gave a decided precipitate with the acetic acid and lead acetate test.

The other samples show a greater reducing than neutralizing value, indicating at once the presence of undecomposed calcium hypophosphite. The calculations in these cases were made as follows: After the removal and estimation of the calcium phosphate and oxalate, if present, the calcium oxide remaining in the solution was found, and from this substracted sufficient CaO to neutralize the H_2SO_4 present in the acid; the remaining CaO was then calculated as $Ca(H_2PO_2)_2$ and the figures obtained in this way agreed very well with those calculated from excessive reduction over neutralization.

The specific gravities given were taken at 15·5°C. The calculations give the following percentage composition to the purchased samples:

	I.	II.	III.	IV.
Sp. Gr.	1·14778	1·15761	1·18011	1·21373
H_3PO_2	30·11	32·76	38·22	44·76
$Ca(H_2PO_2)_2$	——	1·84	1·15	0·85
H_2SO_4	2·03	——	——	——
$CaSO_4$	0·92	trace	0·37	0·96
CaC_2O_4	——	——	0·36	0·71
$Ca_3(PO_4)_2$	——	0·11	——	——

From the results it is evident that the reason of the commercial acid running so low is that there is never sufficient material taken to ensure a fifty per cent. acid; that the acid was not tested volumetrically before being placed upon the market, as this test would reveal the amount of free acid; and that the quality of the acid has not much improved since Mr. Beringer's publication in 1882. Considerable has been written regarding the presence of calcium oxalate in the acid made by use of oxalic acid. With the intention of ascertaining the amount present in a 50 per cent. acid, and at the same time obtaining the specific gravities of the acid containing various percentages of the true hypophosphorous acid, a sample was made from a specimen of calcium hypophosphite containing 98·48 per cent. $Ca(H_2PO_2)_2$. A few experiments were first made to find the best conditions for the precipitation of the calcium oxalate; using cold solutions of the acid and salt, the precipitate was fine and very difficult to wash, but if boiling solutions were employed the precipitate was crystalline and easy to wash.

34·5 gm. $Ca(H_2PO_2)_2$ were dissolved in 225 cc. boiling water, and to this added a solution of 25·2 gm. oxalic acid in 100 cc. boiling water; after boiling for one-half hour and allowing to cool, the mixture was filtered through a little absorbent cotton placed in the neck of a percolator, and the precipitate thoroughly washed with cold water. The filtrate was evaporated on a water bath to 44 grams, making a sixty per cent. acid; after taking the specific gravity the acid was diluted to fifty per cent., etc. The composition of the fifty per cent. acid showed that there was just sufficient material taken, and no excess of calcium salt was present, the neutralization and reduction figures both being 50 per cent., and containing in addition 0·97 per cent. $CaSO_4$ and 0·68 per cent. CaC_2O_4. This amount of calcium oxalate appears to be the extreme limit, being made in a boiling solution; but if this quantity is sufficient to be injurious to health may be decided by more competent persons. The specific gravities of the various acids are given a little later in comparison with the same strength acids made according to the National Formulary. These specific gravities, differing so decidedly from my own and those of other observers, a sample was prepared according to the directions from 41·6 grams potassium hypophosphite and 60 grams tartaric acid. The filtrate is intended to furnish a 10 per cent. acid; the full yield without loss should be 264 grams; the quantity in this case was 223·6 grams, a yield of about 85 per cent. The filtrate was evaporated to 44·72 grams, corresponding to a 50 per cent. acid; after taking the specific gravity at 15·5° C. it was diluted to a 40, 30, 20 and 10 per cent. acid respectively, and the specific gravities taken.

	With Oxalic Acid.	With Tartaric Acid.
60 per cent. acid,	1·2813	———
50 " "	1·2308	1·3277
40 " "	1·1803	1·2517
30 " "	1·1319	1·1812
20 " "	1·0861	1·1161
10 " "	1·0427	1·0567

The National Formulary quotes the specific gravity of the 50 per cent. as 1·400 and of the 10 per cent. acid 1·060; these higher figures may be better understood after the analysis of the 10 per cent. acid is given. After neutralizing the acid the addition of calcium chloride produced a heavy white precipitate of calcium tartrate. The neutralization value was found to be 10·63 per cent. while the reducing value was only 8·35 per cent., indicating the presence of tartaric acid equivalent to 2.28 per cent. H_3PO_2.

$2H_3PO_2 : H_2C_4H_4O_6$
$132 : 150 :: 2{\cdot}28 : x = 2{\cdot}60$ per cent. tartaric acid.

The potassium hypophosphite employed contained 98·21 per cent. KH_2PO_2 and the low results in the acid are possibly explained by the precipitation of some of the potassium hypophosphite when the aqueous and alcoholic solutions were mixed, leaving some of the tartaric acid in solution. It is the tartaric acid then to which is due the higher specific gravities of the acid prepared by this process, and the specific gravities given in the National Formulary would indicate that the sample of acid used in their determination contained even more tartaric acid than the sample made by me. The process is about as expensive as any that could be devised, and judging from the composition of this one sample, yields an inferior preparation to the one made with the use of oxalic acid.

In concluding this work the results may be summed in comparatively few words. 1. The hypophosphites and the acid are not prone to as rapid oxidation as has hitherto been believed. 2. With ordinary precautions and observation of the several suggestions offered in these papers, the preparation of medicinally pure salts and of the acid need be no more difficult than those of other substances in the U. S. P. 3. Should the acid be made officinal, one of 50 per cent. would be the most desirable strength and which can easily be prepared without oxidation taking place; in this case the U. S. P. should adopt at least the specific gravity and neutralization determinations as tests of purity, the former, however, depending much upon the process of preparation.

IODIDE OF AMMONIUM.

A SIMPLE METHOD OF DECOLORIZING WHEN DECOMPOSED.[1]

By John C. Falk, Ph. G.

Iodide of ammonium, as is well known to all pharmacists, is a very unstable compound, the ammonium very easily dissociating from its union with the haloid element iodine.

This decomposition with the resultant coloration from a snow-white salt to a yellow or even dark-brown—depending on the amount of liberated iodine present, is an occurrence seen in nearly every pharmacy. In this condition the chemical is, of course, unfit for use; and, as the small quantities usually on hand in the stores do not justify the trouble and expense of manipulating in the customary methods, such a spoiled salt is generally thrown away or set aside, and a fresh supply obtained.

The pharmacopœial process for the recovery of decolorized iodide of ammonium is to wash it with stronger ether, filter off the latter, and rapidly drying the salt.

R. Rother recommends treating the salt with sulphurous acid and ammonia, and then drying on a water bath. Both these methods are somewhat troublesome to carry out, particularly when the amount of material is small (say, one or two ounces) while the pharmacopœial directions are very apt to result in an expensive product if extreme care is not taken in the use of the ether.

Having several small lots of decomposed iodide of ammonium come into my hands during the past year, it occurred to me that they might be redeemed in a manner that I have not yet seen in print. This consists simply of placing a lump of carbonate of ammonium into the bottle and allowing it to remain there until the salt has regained its normal whiteness; this may require from several days to as many weeks, the time being dependent upon the amount of material and the degree of decomposition it has undergone. The ammonia that is constantly being disengaged from the unstable carbonate unites with the free iodine present to form iodide of ammonium, and, as the superfluous ammonia is subsequently allowed to escape, there is no resulting contamination with a foreign substance.

---

[1] Read before the Missouri State Pharmaceutical Association.

I usually remove the iodide to a large salt-mouth bottle, wrap a vitreous piece of ammonium carbonate in filter paper, drop it into the bottle, stopper tightly and place aside until the desired change has been effected. Then remove the ammonium carbonate, leave the bottle unstopped until the excess of ammonium has disappeared, when the salt is practically pure and ready for use.

DIVISION OF POWDERS.

By Hans M. Wilder.

Mr. Wiegand concludes his article on the above subject (p. 386) by saying that "when odd numbers, such as 13, 17 or 19 are ordered, the best plan is to weigh off the 13th, 17th or 19th of the whole weight," and then advises to divide the remainder by the parallelogram plan. Now, why does Mr. Wiegand not go on a step farther, and advise to divide the powders by weight, *all of them*, as the Germans do, instead of only that odd part? The only objection that can reasonably be made is that it would take more time than could well be spared in the rush of business, etc. This idea of "more time," however, is much exaggerated. In Germany, for instance, where a good many more prescriptions are put up by the individual pharmacist than here (except in hospitals and similar institutions), the pharmacists get through pretty quickly, notwithstanding that prescriptions calling for 24 or 48 powders are no rarity, in spite of having to weigh each powder separately. The writer has for months together had to put up from 70 to 100 prescriptions a day entirely unassisted, and often had a dozen or more prescriptions at a time waiting for him, still he managed to finish within a reasonable time; of course, without some kind of a system it would have been impossible to do so.

Now as to the division of powders: The parallelogram plan is a decided improvement on the "guess-by-eye," but weighing each powder separately is still more accurate; what little time more there may have been used is balanced by the satisfaction of *knowing* that each one of your powders is of the proper weight. Owing to the fact that in dividing, say twelve, not too small powders by weight the last one will usually be short about 1 or 1½ grains, the writer has been in the habit of taking this shortage into account. If the bulk of the powders weighs, for instance, 180 grains, and has to be divided into twelve powders, the writer weighs off 14½ grains instead of 15 grains, and finally distributes the few grains left in the mortar by the eye. That fraction of a grain, which through unequal distribution one or the other powder may get too much or too little, is of no practical account.

PHARMACEUTICAL NOTES.

Abstracts from Theses.

Unguentum Hydrargyri.—Jacquemaire's recommendation (see Am. Jour. Phar., 1888, p. 344) for the rapid preparation of mercurial ointment has induced D. B. Bowman, Ph. G., to experiment with different amalgams in comparison with the process of the present pharmacopœia, by which the extinction of the mercury is facilitated by trituration with compound tincture of benzoin and a little mercurial ointment. Working by this process the globules of mercury became invisible to the naked eye in ten minutes, and the ointment was finished in thirty minutes. The amalgams were prepared in the proportion of 1000 mercury to 1 K, Na, Zn, Sn or Mg; and were triturated directly with the fats and, in separate experiments with the tincture and ointment, as stated. The amalgams with K or Na combined with the fats with difficulty and in part only, the mercury finally separating partly. The Sn amalgam combined better and after an hour's trituration showed no globules visible to the eye; while the zinc amalgam was not completely extinguished. Using Mg amalgam the ointment was finished in fifteen minutes.

On triturating the amalgams with tincture and ointment, as directed by the U. S. P., the ointment was finished, using Sn, in fifteen minutes; while the globules became invisible to the eye in ten minutes with Zn; in fifteen minutes with K; in thirty minutes with Mg, and in two hours with Na.

Pill excipient.—A useful excipient for substances which are very difficult to make into a proper pill mass is prepared by John Howard Witherow, Ph. G., by dissolving with the aid of a gentle heat 100 grains powdered gum arabic and 5 grains benzoic acid in 2 oz. glycerin and adding 4 oz. commercial glucose.

Excipient for Pills of Potassium permanganate.—A slight modification of Mr. Martindale's excipient (see Am. Jour. Phar., 1884, p. 436; 1886, p. 337) is suggested by Gideon H. Macon, Ph. G., substituting spermaceti for paraffin. The proportions are, soft paraffin 2 parts, spermaceti 1 part, and kaolin 3 parts.

Tinctura Gentianæ composita, U. S. P., is recommended by Oliver B. Jacobs, Ph. G., to be prepared with a menstruum of alcohol 3 parts and water 1 part, when it will remain permanently clear. Using alcohol 2 parts to water 1 part, the tincture showed a slight precipitate in two weeks. Made with strong alcohol, the tincture was less bitter in taste and contained about 3·12 per cent. of solid matter, while the tincture made with the menstruum suggested yielded 5 per cent. of extract.

Blackberry brandy, as met with in commerce, varies considerably in appearance and composition. John P. Kelly, Ph. G., procured from manufacturers four formulas for the preparation of blackberry brandy, which are as follows:

1. Fluid extract of blackberry bark, 2 parts; syrup, 2 parts; whiskey, 4 parts.
2. Blackberry juice and brandy, equal parts.
3. Blackberry root, cinnamon, cloves, glycerin and brandy; no proportions given.
4. Blackberry juice, syrup, spices, New England rum; no proportions given.

Four samples, procured respectively from the states of New York, New Jersey, Kentucky and Pennsylvania were examined, with the following results:

1. 1·022 specific gravity; 15 per cent. (weight) alcohol; 19 residue.
2. 1·013 " " 29 " " " 17 "
3. 1·103 " " 25 " " " 35 "
4. 1·033 " " 13 " " " 20 "

The "residue" was obtained by evaporation on a water-bath (temperature not given) until it ceased to lose weight; it appeared to contain considerable glucose and glycerin. The four samples produced dark blue precipitates with lead acetate, due to the presence of tannin and coloring matter; they possessed more of the characters of fruit-wines than of brandy.

NOTES FROM VARIOUS JOURNALS.

COLLECTED BY GEO. M. BERINGER, PH. G.

Thiocamf.—Dr. J. E. Reynolds proposes under this name a new disinfectant prepared by acting on camphor with sulphur dioxide. At ordinary temperatures SO_2 requires a pressure of more than two atmospheres to liquefy it; but camphor owing to chemical attraction can liquefy it without any pressure whatever. In the liquid thus prepared several known bactericides are dissolved. Thiocamf can be preserved without pressure in bottles at mean temperature, mere exposure of the liquid in a thin layer to the air determines the steady evolution of sulphur dioxide. The contents of a six-ounce bottle will yield over 20,000 cc. SO_2. One ounce of Thiocamf shaken up with a quart of water forms a powerful disinfectant for ordinary purposes, while a more dilute solution (1 oz. to the gallon) can be used for soaking clothes which have been in contact with infected persons.—*Chem. News,* June 22, p. 291.

Purification of Bisulphide of Carbon.—In a paper read before the London Chemical Society, Ignatius Singer describes an improved form of furnace and retorts for the manufacture of carbon bisulphide on the large scale. The crude product obtained contains considerable quantities of sulphur, H_2S, and other sulphur compounds, has a pale yellow color and a very disagreeable odor. The author recommends the following method for its purification: A cylindrical vessel about 30 inches in diameter and 6 feet high is provided with a perforated coil of lead pipe at the bottom. The CS_2 to be purified is run into this vessel to about one-third its height. Then lime water is pumped into the vessel through the perforated coil. The lime water being specifically lighter than the CS_2 rises to the surface, and while traversing the body of the bisulphide in a finely divided spray, the lime combines with the H_2S etc. This washing is continued until the lime water which leaves the vessel through an overflow pipe near the top, is perfectly clear. The CS_2 is now run into a still, about 1 per cent. of cheap colorless oil added and covered with a layer of about 1 inch of water to which some sugar of lead may be added. The CS_2 is now distilled in a water bath and condensed in the usual way.—*Jour. Soc. Chem. Industry.*

Test to Distinguish Resorcin from Carbolic or Salicylic Acid.—If a few drops of a solution of sodic hypochlorite are added to a watery or alcoholic solution of resorcin, a violet color, rapidly changing to yellow, is produced. On warming or adding excess of the reagent the liquid gets dark brown. One part of resorcin dissolved in 10,000 parts of water will still show the reaction. Carbolic, salicylic, benzoic and other allied acids do not show the reaction, and at the most turn only slightly yellow on warming. Pyrocatechin, when treated with the reagent, turns a vanishing green; hydroquinone soon gets yellow or red. Another test is to first add a little liquor ammoniæ and then a few drops of the hypochlorite, when the liquid will give a reddish violet color, which changes green on boiling. The coloring matter is not taken up by benzol. The reaction is not shared by salicylic acid, benzoic acid or antifebrin, but carbolic acid thus treated turns a greenish blue, which is partly decomposed by benzol. The colors are changed to red by dilute sulphuric acid.—H. Bodde, *Nederl. Zydschr. v. Pharmacie;* reprint from *The Analyst.*

Dextrin Substitute for Gum Arabic.—A. Schumann has been granted patents in Germany for a process of manufacturing dextrin free from sugar as a substitute for gum arabic. Starch is mixed to a thick cream with cold water and treated with one per cent. of mineral acid. After 24 hours the mixture is washed until free from acid. The starch is again mixed with water to a cream and heated to 160–170°C. by superheated steam until all the starch is converted. This solution is refined and evaporated to dryness.

The active principle of Strophanthus glaber.—M. Arnaud in *Compt. rend.* described recently two crystallized substances, *ouabain,* $C_{30}H_{46}O_{12}$, obtained from the wood of *Aconkathera Ouabaio,* and *strophanthin* $C_{31}H_{48}O_{12}$, from the seeds of *Strophanthus Kombé.* He has since examined the crystallized substance contained in the seeds of *Strophanthus glaber* of Gabon, which furnish the arrow-poison of the Pahonin tribe. This principle appears to be identical with ouabain, which exhibits toxic effects almost identical with strophanthin. Hardy and Galois have also described a crystallized substance from *Strophanthus glaber,* but imperfectly for want of material. These substances are glucosides, and low temperatures must be adhered to in the extraction in order to avoid decomposition. The crystals of the glucoside from the seeds of strophanthus glaber (which gave the remarkably high yield of 4·7 per cent.) are transparent, very slender, and of rectangular form; by slow crystallization they are thicker and become opaque. The melting point is about 185° C., but a pasty condition obscures the exact point of fusion. The crystals dissolve in 150 parts of water at 8° C. The aqueous solution exhibits left-handed polarization, and a solution containing 6·5 per cent. at 50° C. gave the coefficient $a_D =$ —33·8. Under the influence of dilute acids and heat the substance splits up into a reducing sugar and a peculiar insoluble resin. The crystals of ouabain have the formula $C_{30}H_{46}O_{12},7H_2O$, of which only 6 molecules of H_2O are given off at 100° C.—*J. Soc. Chem. Ind.*

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph. G.

Guaiacol may be easily distinguished from *creasote* by the following test: 2·5 cc. are dissolved in 25 cc. 90 per cent. alcohol and to 4 cc. of this solution 10 cc. pure sulphuric acid slowly added; *guaiacol* produces a red solution, the color of which is still persistent after several days; *creasote* produces only a brown color.—Dr. Karpow, *Pharm. Ztschr. f. Russl.*, 1889, 423.

A novel adulterant of whole black pepper, which is not easily detected on sight, is an ore of iron (by analysis found to agree with the so-called bean-ore). It is used in small globular pieces which only after close inspection are seen to be of a somewhat lighter color than the pepper. The weight of the adulterant requires the addition of only a small bulk to make considerable gain.—Dr. H. Weller *Chemiker Ztg.*, 1889, 1030.

Apomorphine as a test for nitrous acid and nitrites, being as sensitive as metadiamidobenzol, is especially adapted to the examination of drinking waters. 0·02 gm. crystallized apomorphine hydrochlorate are dissolved in 100 cc. of the water to be examined and then a little sulphuric acid is added; traces of nitrites are sufficient to develop a distinct red coloration. Dilute nitric acid does not interfere with this test, but concentrated nitric acid produces the same coloration, due, probably, to the reduction of the nitric acid.—*Pharm. Ztg.*, 1889, 429.

Color reaction for cocaine.—In a watch-crystal with white background or in a small porcelain capsule several crystals of resorcin (about 0·01 gm.) are agitated with six to seven drops of pure concentrated sulphuric acid and to the faintly yellow fluid 0·02 gm. cocaine hydrochlorate added; after an immediate energetic reaction the fluid assumes a beautiful blue color, becoming more intense; the addition of a drop of sodium hydrate solution changes the blue color to red. The test applied to salts of morphine, strychnine, veratrine, and atropine gave no coloration which even approached the above.—M. Goeldner, *Pharm. Ztg.*, 1889, 471.

Composition of some non-drying oils.—The isolation of the fluid acids of the fixed oils being difficult and in some cases almost impossible, K. Hazura and A. Grüssner adopted a procedure in which the fluid fatty acids were first oxidized in alkaline solution with potassium permanganate and then the products of oxidation separated and examined. The products of oxidation of those acids found to compose the examined oils are here given:

Hypogæic acid, $C_{16}H_{30}O_2$, forms *dioxypalmitic acid,* $C_{16}H_{30}O_2(OH)_2$.

Oleic acid, $C_{18}H_{34}O_2$, forms *dioxystearic acid,* $C_{18}H_{34}O_2(OH)_2$.

Linoleic acid, $C_{18}H_{32}O_2$, forms *sativic acid,* $C_{18}H_{32}O_2(OH)_4$.

Arachis Oil.—The fluid fatty acids of this oil consist of linoleic and oleic acids and probably hypogæic acid. The oil obtained from different sources was found to contain varying quantities of hypogæic acid so that this last named acid is at times difficult to isolate.

Almond Oil.—Thirty grams of the acids from this oil after oxidation were found to yield 3·8 gm. sativic acid and 18 gm. dioxystearic acid indicating that the oleic acid is accompanied by a fair quantity of linoleic acid and to which is due the high iodine absorption of almond oil. It has always been stated that almond oil furnished the purest oleic acid but the examination of other non-drying oils may reveal an oil free from the glyceride of linoleic acid.

Sesame Oil.—From thirty grams of the acids of this oil could be obtained 7 gm. sativic acid and 12 gm. dioxystearic acid; hence linoleic acid is present in larger amount than in almond oil.—*Pharm. Post,* 1889, 520 and 545.

Sunflower Oil consists chiefly of the glycerides of linoleic and oleic acids; as the latter is present only in minute quantity this oil furnishes the best material for the preparation and study of linoleic acid. —A. Hazura, (*Monatsh. der Chemie*); *Arch. der Pharm.*, 1889, 654.

Uralium, a New Hypnotic.—Dr. G. Poppé, of Bologna, recently presented the Medico- chirurgical Society of that city with a monograph on uralium, a new hpynotic, being a composition of chloral and urethan. Poppé claims that it is both safe and efficient, and strongly recommends it in cases of insomnia of hysterical origin or cardiac trouble.—*Gaz. degli Ospitali*; *Med. News,* May 25.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

TANGHININ.—M. Gley (*Comptes rend. de l'Acad. des Sci.*, June 17) announces that he has separated from the nut of *Tanghinia venenifera* 25 gm. of a crystallized principle to which he has given this name. He exhausted the seeds of fat with sulphide of carbon and treated the residuum with concentrated boiling alcohol, finally distilling the liquid and proceeding in the usual way to obtain crystals. The substance fuses at 182° C. (359·6° F.), and, at higher temperatures, burns without ash; it is soluble in about 200 parts of water; after several hours' contact with water it swells to a thick mucilage. It is very soluble in alcohol and ether and deflects polarized light to the left. Under dilute acids it decomposes into a resin and "a minute quantity of a very bitter substance." Like strophanthin and ouabain, tanghinin does not contain nitrogen. "It is neither," says M. Gley, "an alkaloid nor a glucoside." It is a powerful cardiac poison and is used in Madagascar for the execution of criminals.—*Répert. de phar.*, July.

PYRODINE MUST BE USED CAUTIOUSLY.—According to M. Guttmann (*Semaine Med., May* 8), pyrodine, or acetyl-phenylhydrazine should be administered only under great precautions from the facts that it may be toxic in very small doses and that it attacks the blood globules. He advises that the quantity administered daily do not exceed 10 cgm. (taken in one or two doses), that is if the treatment is to be prolonged. He thinks however, that treatment with pyrodine should not continue for more than three days. The *Répert. de phar.* for June, states that in a communication to the French Society of Biology, Dr. Lemoine also stated that the daily dose should be 10 cgm. and should never exceed 15 cgm., adding that 25 cgm. had given rise to grave toxic symptoms.

PURGATIVE CHOCOLATE.—M. Giraud proposes a preparation made as follows: Cacao (powdered and freed from oil), 50 gm; sugar (pulv.), 100 gm.; ol. ricini, 50 gm.; vanilla (pulv.) q. s.; make into tablets. The oil should be incorporated with the cacao and the sugar and vanilla added; the ingredients must be well worked up upon a heated slab and allowed to cool in molds.—*Bull. Soc. Ph. Côte-d'Or; Répert. ph.*, June.

QUICK METHOD OF PREPARING RIVIÈRE'S POTION.—It is proposed by Eymonnet and Kauffeisen to keep on hand two syrups made as follows: No. 1. Citric acid, 43 gm.; distilled water, 120 gm.; sugar, 180 gm.; extract of lemon, 6 gm. No. 2. Bi-carbonate of potassium, 30 gm.; bicarbonate of sodium, 8·40 gm.; distilled water, 120 gm.; sugar, 180 gm. The syrups keep well, No. 1 being too acid and No. 2 being too alkaline to give rise to fermentation. To prepare the Rivière potion of the Codex, 17 gm. of each of these syrups are added to 58 gm. of water.—*Répert de ph.; Jour. de Méd.*, June.

Picric Acid Mixture.—The following preparation proposed by Dr. Calvelli is said to have been successfully used as a paint in erysipelas, lymphangitis and dry eczema: Picric acid, 1·50 gm.; distilled water, 250 gm.; dissolve; for external use. The application is said to have the property of reducing swellings and rapidly dispersing the heat which accompanies them.—*Monit. thérap.; L' Union phar.*, May.

Administration of Butylchloral.—The *Monit. thérap.* for May gives the following formula as the one prescribed by Dr. Liebreich for neuralgia of the tri-gemini. The preparation seems to be regarded as a specific for this condition: Butylchloral, 3 to 5 gm.; rectified spirit, 10 gm.; glycerin, 20 gm.; distilled water, 120 gm.; mix; dose, 2 to 4 tablespoonfuls.

Palatable Scraped Beef.—M. Carles, of the Bordeaux Faculty, having observed that many patients soon contract a repugnance for scraped beef, found by experiment that if the pulp be first mixed with a little beef soup and afterward with a small quantity of pea or lentil soup, and heated gently in a water-bath, the unpleasant taste and odor pass wholly away. The mass should be passed through a hair sieve before heating.—*Nouv. rem.*, June 24.

Pills of Tar and Iodoform.—Négel gives the following formula for these pills which, he says, are well supported by phthisical patients: Iodoform, 3 gm.; vegetable tar, 15 gm.; extract of opium, 60 cgm.; make 120 pills. The writer states that the addition of 5 to 10 per cent. of tar to iodoform, perfectly deodorizes the latter.—*Répert. de phar.*, July.

To Prepare Antiseptic Sponges.—The mineral matters near the stems should be carefully removed and the sponges thoroughly beaten with mallets and washed in running water. They should then be placed for six hours in a bath composed of: Hydrochloric acid, 10 gm.; water, 1 litre. Now wash thoroughly in water and soak again for six hours in a solution of: Permanganate of potash, 1 gm.; water, 1 litre. Wash again and place for two hours in a mixture of: Solution of bi-sulphate of soda, 10 gm.; hydrochloric acid, 1 gm.; water, 1 litre. The sponges (now of a yellowish-white color) should be again washed and put by for use in a solution composed as follows: Phenic acid, 1 gm.; alcohol, 5 gm.; water, 1 litre. If the odor of phenic acid is objectionable, the sponges may be preserved in the following solution: Thymol, 1 gm.; alcohol, 4 gm.; water, 1 litre.—*Bull. Soc. de Phar. de Bordeaux.*

STAR-ANISE OIL.

A star-anise tree, when at its full strength and in a favorable crop year, bears about 2¼ cwt. of fruit, which yield about 4 per cent. of essential oil, though it is said that if a less primitive still were employed than that used by the Annamites of Indo-China, the percentage might be sensibly increased. The tree yields a full and a small crop every alternate year. The Annamites distinguish three varieties of oil—white, red-brown and yellow. The first is obtained from green or badly-kept fruit, the second is the usual variety, and the yellow oil is the best; but there is very little of it to be had, as the natives rarely dry the fruit in the sun, that being a slow process and said to decrease the outturn. The natives never use star-anise oil themselves.

Until the French occupation of Indo-China the distilling was done exclusively by the Chinese merchants, who bought up the seeds from the natives, and paid a tax to the Annamite Government for the use of the stills, but since the French conquest the natives do all the distilling, hiring the stills from the Chinese. In 1887 the monopoly of purchasing star-anise oil from the natives during the seasons 1887 and 1888 was let by contract for the first time for the sum of 26,050 francs—a little more than 1,000*l.* The four principal distilling centres are Ha-Lung, Lang-Son, Ky-Lua and Dong-Dong—names which have become familiar of late as the scenes of several battles fought by the Annamites against the French. In the village of Ha-Lung alone there are twelve stills, and about sixty stills altogether in the district. The contractor has the right to levy a tax of four francs on every picul of seed sold to anyone else, but, as a matter of fact, he is now practically the only wholesale dealer in the market. In 1887 about fifty tons of oil were sold to him, for which he paid an average price of about 7·20 francs per kilo., or, say, 3s. 4d. per pound for the oil.

The cost of carrying the oil from Lang-Son, the central market, to Hanoï, the shipping port, is about 4½d. per pound, and it is believed that to the Hanoï importers and the Havre merchants engaged in the article there has been a profit on this trade (taking the average price of the two seasons) of about £10,000, or fully 30 per cent. of the entire amount.

It is thought that the lease of the oil-farming rights for the season 1889 will give rise to considerable competition, and that a much higher price will be paid for it than on the previous occasion, the more so as since then large tracts of land where the star-anise tree is grown, and which formerly were altogether outside the French jurisdiction, have been occupied by the French troops. The oil and the seed from those districts came formerly into commerce by way of China, but will now pass through the French port of Hanoi. Outside the French dominions in Tonquin the star-anise tree is said to be very scarce, and the territory at present in the hands of the French will, they believe, give them a virtual monopoly of the trade. For about fifteen years the French have been trying, at great cost, to acclimatize the trees in their African colonies on the Senegal, but without result. If we may rely upon the figures given above, the production of oil of star-anise in 1887 in French Indo-China alone equalled about 112,000 pounds, against an annual production of 94,000 pounds of oil of *Pimpinella Anisum*, according to Messrs. Schimmel & Co.'s calculation.—*The Chemist and Druggist*, June 8, p. 795.

FALSIFICATION OF OLEIC ACID BY LINOLEIC ACID.[1]

By Granval and Valser.

Oleic acid is much used in the woolen manufacture, and the presence of linoleic acid causes serious inconvenience. In testing for this adulterant, comparative experiments should be made on commercial oleic acid of good quality. (1). The impure acid has a yellowish-brown tint, paler than the standard. (2). The density is higher, say 0·912—0·919 in various samples at 15°, whilst the standard never exceeds 0·905. As the impure sample is clotty at 15°, it is necessary to take the specific gravity at a higher temperature and add 0·00064 for each degree above 15°. (3). On heating the impure acid to 50°, it becomes more consistent after cooling, and this change is accentuated each time the operation is repeated up to a certain point. (4). 50 grams dissolved in 450 cc. of 85 per cent. alcohol produces on shaking a glistening precipitate, whilst pure oleic acid dissolves completely; other oils give deposits, but not of the same character. The precipitate is collected, washed with alcohol, dried, and is then found to melt at about 47°. It is easily saponified, yielding a soda soap completely soluble in water, with which it forms a jelly on cooling when only present to the amount of 1 : 100. (5). If Poutet's reagent be applied to the impure acid, the mass remains more or less liquid, whilst oleic acid becomes solid by the following day. (6). A thin film of the impure acid soon becomes resin-like, whilst the oleic remains almost unchanged. (7). If a few drops of impure acid are added to soda-lye, an intense yellow color is produced, whilst the pure acid gives a grayish tint only.

---

[1] *J. Pharm.* [5], xix, 232–236; reprinted from *Jour. Chem. Soc.*, August, 1889, p. 799.

THE SALTS OF MILK AND THEIR RELATION TO THE BEHAVIOR OF CASEÏN.[1]

By F. Söldner.

Two series of determinations of the ash constituents of milk gave the following results in grams per litre of milk:—

	Cl.	P_2O_5.	K_2O.	Na_2O.	CaO.	MgO.
I...	0.820	2·437	1·885	0·465	1·720	0·205
II...	0·980	2·400	1·720	0·510	1·980	0·200

The sulphuric acid was not determined, as it does not pre-exist in the milk, but is produced from the sulphur of the albuminoids; the small amount of iron was also neglected. In grouping the ash constituents as salts, account has to be taken of the fact that a portion of the phosphoric acid found in the ash is derived from the phosphorus of the caseïn; the amount of phosphoric acid to be deducted is 0·581 gram per litre of milk, assuming the latter to contain 3 per cent. of caseïn.

Hammarsten showed that caseïn has acid properties, yielding salts with bases, and obtained a calcium-derivative which contained 0·8 to 1·2 per cent. of lime. The author finds that there are two distinct compounds with calcium; the one, containing 2·39 per cent. of lime, shows an alkaline reaction with litmus, but not with phenolphthaleïn;

---

[1] *Landw. Versuchs-Stat.*, xxxv, 351—436; from *Jour. Chem. Soc.*, June, 1889.

whilst the other compound does not react either with litmus or with phenolphthaleïn, and contains only 1·55 per cent. of lime. The basicity of caseïn was also determined by titration with soda, using phenolphthaleïn as indicator. Neutral or slightly alkaline solutions of calcium-caseïn, prepared by rubbing together the corresponding amounts of caseïn and calcium carbonate, become turbid only when kept for some time; but when an alkaline calcium-caseïn solution is neutralized or acidified it at once becomes turbid. Alkaline, neutral, or just perceptibly acid solutions of calcium-caseïn do not curdle when boiled; the addition of more acid causes the solutions to curdle, the temperature required becoming lower as the amount of acid present increases. The calcium-derivative which reacts alkaline with litmus is not curdled with rennet. Hence it is probable that caseïn is present in milk as neutral calcium salt (with 1·55 per cent. of lime). Assuming this to be the case, and making the correction for phosphoric acid already given, a litre of milk will contain in grams—

	NaCl.	KCl.	K_3PO_4.	K_2O.	$Ca_3P_2O_8$.	$Mg_3P_2O_8$.	CaO (in caseïn).
I...	0·877	0·603	1·653	0·405	2·315	0·447	0·465
II...	0·962	0·830	0·903	0·595	2·793	0·436	0·465

The excess of base is probably present in the milk as organic salts, Henkel having shown that citric acid is a constant constituent of milk to the extent of at least 1 gram per litre. There is reason to suppose that milk contains a still greater amount of organic acid, and this is assumed, for the present purpose, to be citric acid.

Analyses of milk serum, prepared by Zahn's method, by filtering milk through porous battery cells, showed that the whole of the potash, most, if not all, of the soda, and the greater part of the magnesia present in milk are in the form of soluble salts, so that the caseïn salt can only be a calcium-derivative. The acidity of milk to phenolphthaleïn is probably due to the presence of acid phosphates, and to the power of caseïn of uniting with a further amount of base without becoming alkaline towards phenolphthaleïn. Calculated from the results of Series II, the salts present in the milk may be grouped as follows (in grams per litre):—

Sodium chloride	0·962	Magnesium citrate	0·367
Potassium chloride	0·830	Dicalcium phosphate	0·671
Monopotassium phosphate	1·156	Tricalcium phosphate	0·806
Dipotassium phosphate	0·853	Calcium citrate	2·133
Potassium citrate	0·495	Lime (in caseïn)	0·465
Dimagnesium phosphate	0·336		

Hammarsten (*Jahresber. für Tierchem.*, 1874, 135) considers that caseïn acts as a solvent for calcium phosphate, whilst Eugling (1885) believes that the caseïn enters into combination with tri-calcium phosphate, a view which is also held by Schaffer (*Landw. Jahrb. d. Schweiz*, 1887). Eugling's theory is rejected as being based on erroneous suppositions.

Determinations of lime and phosphoric acid were made in milk, in the serum of milk filtered through porous cells, and in the insoluble portion of milk. 36 to 56 per cent. of the phosphoric acid, and 53 to 72 per cent. of the lime are undissolved, being probably in suspension. The undissolved lime (not in caseïn) is in combination with phosphoric acid as a mixture of di- and tri-calcium phosphates (compare Duclaux, *Ann. inst. nat. agronom.*, viii). It was found that of the undissolved phosphoric acid and lime, 44 to 72 per cent. and 26 to 67 per cent. respectively, could be dissolved in carbonic or acetic acid.

Eugling (*loc. cit.*) states that the calcium salts in milk are not precipitated by ammonium oxalate. The author finds that 85 per cent. of the calcium is precipitated; at the same time there is a change in the appearance of the milk which indicates that the reactions which take place extend to the caseïn, probably with formation of an ammonium salt. Serum obtained by sodium chloride, and that obtained by alcohol, are both precipitated by ammonium oxalate, just like the serum produced by rennet. Eugling's negative result with alcohol serum was, no doubt, due to the presence of alcohol, which is shown to prevent the formation of calcium oxalate.

With regard to the decrease in the acidity of milk, observed by Schaffer (*loc. cit.*) to be produced by the action of rennet, it is found that if the caseïn is made to separate in a finely divided state, so that the whole of it may come into contact with the alkali, and if, at the same time, unnecessary dilution of the curdled milk is avoided, the acidity of the milk remains constant. Boiling has no effect on the acidity of the milk.

The belief that caseïn in milk is in combination with calcium phosphate originated in Hammarsten's observation that the curdling of milk by rennet is connected with the presence of calcium salts. Hammarsten showed that other alkaline earths may be substituted for lime, and that they may be present as sulphates and carbonates, and still have the same action (compare Lundberg, *Jahresb. Tierchem.*, 1876, 11). It is shown that calcium phosphate suspended in a caseïn solution does not help the curdling by rennet, but that the presence of a soluble calcium salt is necessary; it is immaterial whether the salt is phosphate or chloride, etc.

According to Mayer (*Milchzeitung*, x, 36), when milk is heated at 75° it undergoes a change, and at a still higher temperature, but still much below 100°, it loses its power of being curdled. Experiments made by the author show that milk does not necessarily quite lose the power of being curdled by being heated at 100°, although the time required to curdle milk so treated is much lengthened, especially with milk of less than the usual acidity. The reason that boiled milk will either not curdle at all, or requires a longer time to curdle than fresh milk, is that a part of the dissolved calcium salt is precipitated as tricalcium phosphate. For the same reason curdling of milk by rennet is also prevented, or retarded, by adding more or less alkali. In either case, the property of being curdled by rennet may be restored to the milk by adding acid, passing carbonic anhydride through it, or by the addition of a soluble calcium salt. The author confirms Schaffer's statement that boiled milk treated with carbonic anhydride curdles more quickly than fresh milk.

ON THE ACID FERMENTATION OF MILK.[1]

By Dr. Fokker.

It has been well known for some time that the souring of milk is caused by bacteria, and one would expect that by this time the specific germ would be sufficiently well known. But it is not so. Hueppe and Marpmann, who have studied the subject minutely, are of opinion that there are more germs than one that possess the power of souring milk, and Grotenfeld has quite recently declared that the milk-souring germ is a modification of ordinary saprophytes, or that its properties are due to culture, and that there is no specific germ ferment causing the acid fermentation of milk.

Our author has spent some considerable time in experimenting on the subject, and his paper consists of a short description of these experiments, and a resumé of the conclusions he draws from them. He agrees with Grotenfeld, and thinks his own experiments justify him in maintaining that the rôle played by the germ in milk souring is a very subsidiary one. For his experiments he first takes four small retorts (Kölbchen) containing each 50 ccm. of sterilized milk, and adds to them different quantities of a pure culture of the so-called milk ferment germ, *e. g.* :—

---

[1] *Fortschritte der Medicin*, June 1st, 1889; translated by W. A. Stewart for the *Medical Chronicle*, July.

Vessels.	Pure culture germs.	Acidity after One day.	Two days.
1	1 drop	28·4	42·5
2	2 “	28·5	42·4
3	10 “	28·9	43·5
4	50 “	30·2	43·5

This experiment was repeated several times, always with a similar result. The natural conclusion is that the fermentation is influenced by something besides the germs. Might it be the casein? Before Pasteur discovered the germs Liebig held that casein was the specific milk ferment, and the following experiment supports Liebig :—

Casein prepared and filtered.	Acidity after 1 day.	2 days.
1	6·6	10·9
2	6·6	11·0
3	6·8	11·3
Not filtered.		
1	3·1	0·6
2	3·3	1·4
3	3·3	1·7

The next experiment with casein added is still more striking :—

	Casein added.	Acidity after 1 day.	2 days.
1	0	2·7	5·7
2	1 ccm.	4·0	9·3
3	5 “	7·6	12·3
4	10 “	10·7	19·7

This proves that the amount of casein has considerable influence; still, the fermentation is not in proportion to the amounts of casein added. This, however, is explained by the increased concentration of the fluid, as a parallel experiment, with fresh milk (infected with sour) and milk sugar, proves :—

	Milk sugar solution.	Acidity after 1 day.	2 days.
1	0	3·8	4·0
2	5 ccm.	4·5	5·4
3	10 “	5·0	7·3
4	20 “	6·5	2·1

The casein evidently plays a part—an important part, but what part? Liebig maintained that casein was itself the ferment, but Pasteur proved the germs indispensable. Pasteur's mistake lay in considering the casein only a food for the germs.

What is our author's opinion? He holds, as he explained two years ago, that animal protoplasm, as blood, muscle, etc., has the power, without the aid of germs, of turning starch into sugar and sugar into acid; casein resembles animal protoplasm in this respect, and consequently in the souring of milk two factors are at work, one acid fermentation being due to the casein and another to the germs. If this be true, the place of the casein might be taken by other substances. He finds that it is so. *Coagulated* albumen and yoke of egg have a particularly powerful action. He found also that heating the casein for one and one-quarter hours (in steam of five atmospheres pressure) had no effect in diminishing, but even increased its power as a ferment. Is the action then purely mechanical, depending like that of platinum sponge on porosity? It seems not. Wadding and amber have no effect; glass-wool, by giving alkali to the fluid, even diminishes its acidity. Sponge slightly increases it, owing to its animal basis.

One may conclude then that this "*power of furthering the production of acid*" is peculiar to animal substances. The method of action we do not know and *vital* (Wirkungen der Lebenserscheinungen) is the adjective Fokker would apply to it, *life, however, being always considered resolvable into simple chemical action.* What part do the bacteria take? Fermentation, we know, is impossible without them. The germ, as he poetically puts it, is the spark that kindles the firework—that it turns out a pillar or a temple, depends not on the spark, but on the construction of the firework; and, as a spark from another fire or a spark from a match box begins it equally well, so also, according to Grotenfeld, the fermentation may be set agoing by the regulation germ, or by an ordinary saprophyte a little bit modified.

Our author is by and bye to give us the result of further researches on the subject. He has found in the atmosphere about a goat and on the hairs of the same animal bacteria capable of souring sterilized milk. He found numerous others, but none capable of curding and acidifying to the same extent or with the same rapidity as the germ in ordinary sour milk.

ON THE ESTIMATION OF DIASTASE IN MALT EXTRACT.

By A. Percy Smith, F. C. S.

The method usually recommended for the estimation of diastase in wort or extract of malt depends for its results upon the time taken to saccharify a known weight of starch, the end of the reaction being ascertained by the failure of iodine to strike a blue color.

This method is, in my opinion, defective and inaccurate. A non-diastasic extract cannot be distinguished from one which contains a small quantity only of the ferment without the employment of an elaborate system, using starch solutions of many and varying strengths. The end reaction is not sharp, owing to the starch being reduced to a minimum and to the solution being hot.

A more convenient and exact method, although not claiming scientific accuracy, consists in estimating the reducing-power of the extract on Fehling's solution before and after digestion with an *excess* of starch during a period of four hours at a temperature of 60° C.

The starch solution I employ has a specific gravity of about 1·02, and is made by dissolving a dessertspoonful of starch in about two litres of water, using the supernatant fluid after deposition has taken place. The actual strength is of no consequence.

In the examination of thick malt extracts I make a 1 per cent. solution in distilled water, taking care not to heat it above 60°C. in the act of solution; 10 cc. of this are diluted with 150 cc. of water and boiled in a dish, while the Fehling is added from a burette held in the hand. I prefer this method to the converse, as it is easier to determine the presence than the absence of a blue tint. The operation is more rapid, and one avoids the discrepancy caused when invert sugar acts upon a larger quantity of copper solution than it is able to reduce.

In a duplicate experiment in which the copper solution is added all at once, instead of gradually, it will be found that $\frac{1}{2}$ cc. less is required.

The same quantity of solution, viz. 10 cc., is digested with 25 cc. starch solution for four hours at 60° C., when it is diluted with 150 cc. water and treated as above. The number of cc. of Fehling used in each case is calculated into "sugar" per cent., and their difference into "increase per cent." Less than four hours' digestion with starch will not suffice, although the chief part of the work is done during the first hour. Thus the following numbers show the results of a series of experiments embracing a period of four hours, and give the number of cc. of Fehling taken by 5 cc. of a 1 per cent. solution of extract of malt.

Time............	½ hour	1 hour	1½ hour	2 hours	3 hours	4 hours
Cc. required....	10·8	11·5	12	12·5	13	13·5

A longer time than four hours has not, in my experience, been found necessary.

In dealing with wort make a 5 per cent. by *volume* solution, and proceed as above.—*The Chemist and Druggist*, June 29, p. 873.

THE PRINCIPLE OF DISINFECTION IN MEDICINE.[1]

By Dr. Carter.

Dr. Carter's object is to indicate the dawn of new methods of treatment by which the destruction of infection, hitherto only practiced outside the body, is to be transferred to the tissues—a proceeding which he fitly calls disinfection. "As an indication of the kind of work that can be done in this direction, it is only necessary to allude to some suggestive experiments by Brieger, who found that the typhoid bacillus, although it grew well in peptone, appeared to form no alkaloids from it. . . When he cultivated it in beef-tea, however, he obtained as a product of decomposition an exceedingly small quantity of ptomaine, which among other effects, caused, when injected into guinea-pigs, profuse diarrhœa. The bacilli were not killed by the peptone, they were not even prevented from growing and increasing; but they were rendered powerless for evil. Should not a single fact of this kind afford a powerful stimulus to renewed study of the relations of diet to some kinds of disease?"

"How new and how strange this is may be judged by the following quotation from Dr. Lauder Brunton's book on the 'Disorders of Digestion,' which was not published till 1886. 'One author,' he says, not even mentioning his name, 'has gone so far as to consider that the immunity which one attack of an infective disease confers against a subsequent one is due to alteration in the body, not by bacteria or other low organisms, but by a chemical substance which they produce, and he has proposed to afford protection against the disease by cultivating the bacteria artificially, and inoculating with the poison which they produced without the bacteria themselves. This does not seem a very promising method of treatment.' Yet there was no reason for despair, for facts were now and then coming to light—the bye-products, as it were, of inquiries dedicated to other ends, and sometimes disregarded, as residual phenomena too frequently are—which at any rate showed how greatly the virulence of any bacillus could be mitigated by slight, and what, but for the experiments demonstrating their effectiveness, would have been judged perfectly useless differences in the conditions of their development. As an illustration of such mitigation may be related an incident which occurred in the course of Dr. Klein's experiments to determine the influence of perchloride of mercury on bacillus anthracis and its spores. He prepared a nutritive medium of agar-agar, meat extract, peptone, and salt, and inoculated two sets of tubes containing this mixture with the blood of a guinea-pig, dead of virulent anthrax. The mixtures in the two sets of tubes were made with similar proportions of portions of the very same materials, only that for one set was made at a different time from that of the other, and for sterilization purposes one happened to be boiled longer than the other. 'When they came to be used one set was darker than the other.' Anthrax bacilli grown on these two, and then inoculated into guinea-pigs, differed greatly in virulence. That grown on the light-colored mixture killed by the end of the second or beginning of the third day; that on the dark mixture not earlier than the end of the sixth, or even of the seventh day."

---

[1] *Liverpool Medico-Chirurgical Journal;* reprinted from *The Medical Chronicle*, June, 1889.

Happily, however, the theoretical objections to the method have not prevented its tentative application in practice. The greatest obstacle to its progress has been the phagocyte theory of Metschnikoff, who may or may not have drawn correct deductions from what he saw, but who, at all events, made too wide an application of his theory of the destruction of germs by the tissue cells.

"The evidence in support of the new order of ideas to which I have referred comes from various quarters. It is supplied by competent men working nearly simultaneously with different chemical agents and different methods on different animals suffering from different infective diseases, and yet it all tends to establish the same conclusion, viz., the possibility of affording protection against various kinds of infection by the employment of merely chemical agents.

Each witness, therefore, unconsciously strengthens the testimony of all the others, and thus renders it probable that the principle is a sound one, for, if one were mistaken, it is not likely that all would be.

“The first work that I will briefly mention is that of Dr. Cash, and I will relate one or two of his experiments, which fairly illustrate my meaning, in his own words:

“‘A large rabbit, weighing 3,010 grams, received hypodermically in the course of seventeen days a total of ·0125 gram of corrosive sublimate’ (about $\frac{1}{8}$ grain in the seventeen days, or $\frac{1}{136}$ grain per day). ‘It was then inoculated with fresh anthrax blood of a guinea-pig, which had succumbed to the disease in 40 hours. . . A second unprotected animal was inoculated at the same time, and died of typical anthrax on the evening of the third day.’

“The protected animal had only a moderate rise of temperature. It lived, and was re-inoculated more than four months after the first inoculation without injury, a control animal submitted to a similar inoculation rapidly dying.

“Another protected rabbit was inoculated with the fresh blood of a guinea-pig dead of anthrax, and on the third, fourth, and fifth days after the inoculation its own blood was carefully examined, and on the two latter days unprotected guinea-pigs were inoculated with it. Both experiments were negative. No bacilli were found from the examination, and the guinea-pigs were unaffected.[1] Would not these experiments, even if they stood alone, be sufficient to stimulate inquiry and excite hope? They do not stand alone, yet the necessity of continued inquiry is shown by the next chapter in this history. It is that contributed by Dr. Klein.[2] Adopting a different method, he found the bacilli of anthrax would have their virulence so diminished by being grown in medicated culture media containing proportions of corrosive sublimate varying in amount according to the proved virulence of the bacilli, their spore-containing or sporeless character, etc., as to be capable of injection into different animals without ill effects. But he found that what would destroy the virulence of bacilli of one disease would not impair that of those of another, so that the chemical antagonizers of each must be sought by actual experiment.

“Facts of this kind cannot fail to engender hopes that we may one day be able to antagonize the cause of a fever by chemical means, *i. e.*, actually cure the disease."

---

[1] Thirteenth Annual Report of the Local Government Board.

[2] *Ibid.*, p. 156, *et seq.*

The author then goes on to mention M. Gamaleia's communication to the Académie des Sciences of Paris, August 20, 1888. He made a communication to the following effect. Ordinary cultures of Asiatic cholera are innocuous when injected into pigeons. If, however, the inoculation is made into a guinea-pig, the microbe acquires there an intense virulence for pigeons, and kills pigeons, producing a dry cholera, with exfoliation of the intestinal epithelium. After the microbe thus rendered virulent has been passed a few times through pigeons, its virulence becomes such that one or two drops kills every pigeon into which it is injected in from eight to twelve hours. "It has the same effect on guinea-pigs, but now comes a startling result. Koch failed to give cholera by inoculations with the common bacillus. Yet, by inoculating a pigeon twice with an ordinary non-virulent culture of cholera, it was rendered absolutely secure from infection by the virulent blood which had killed every unprotected bird. And this was not all; for, by first of all cultivating the virus in a nutritive medium, and then heating it to 120° C. for twenty minutes, so as absolutely to destroy every contained microbe, a very active chemical substance is left in the sterilized culture, which in large doses will kill in from twenty to twenty-four hours; but in small successive doses will be entirely inoffensive and innocuous, and yet give absolute immunity against the induction of cholera by even large doses of the virulent blood."

In the December number of the *Annales de l'Institut Pasteur*, for 1887, a similar immunity is claimed to have been obtained by purely chemical vaccination against septicæmia by MM. Roux and Chamberland, while almost at the same time Dr. Salmon, in the "Annual Report of the Department of Agriculture of the United States of America," claims to have given pigeons immunity against hog cholera by injections of sterilized cultures of microbes of that malady.

The protection conferred by Pasteur's inoculations against rabies is now known to be a chemical action.

"Lastly," continues Dr. Carter, "for yet another malady and by yet another method has the same principle been established. The experimenter this time was Bouchard, and the details are given in the *Comptes Rendus de l'Académie des Sciences* for 4th June of the present year. The method was as follows: A series of animals were inoculated with the bacillus of blue pus, and the urine passed by them until the time of their death collected and filtered through porcelain. To make quite sure that no microbes were present in the urine, it was sown in culture media, but with absolutely negative results. Some of the urine thus free from organisms was then injected every second day into three rabbits, which received 205 cc., 145 cc, and 140 cc. respectively. One rabbit was killed by an accident, the other two, at the end of from twelve to fifteen days, were affected with a paralysis of the posterior limbs, exactly like what is produced by inoculating under the skin the pyocyanic microbe. Later on these two rabbits, together with two control rabbits, were submitted to an intravenous inoculation of about 1 cc. of a culture of the pyocyanic bacillus. The control animals died speedily, the other two remained well. This experiment not only proves that the chemical product of the pyocyanic bacterial life is protective against the disease; it proves that it is *it* and not the bacterium which causes the symptoms; and, lastly, it proves that some if not all of the toxic product is eliminated by the kidneys, and thus affords another instance of the advantage and necessity of a much more extended and critical examination of the urine in disease than we have been accustomed to make.

"Can all these men—some of the ablest in their several walks—be deceived?"

I omit observations by Dr. Carter on some applications, apparently of a specific nature, of calomel, and on the value of chlorine in certain diseased conditions of the intestines; and, as I have extracted already so largely from this paper, I shall merely refer to the theory, rather suggested than put forward, that disinfection is in general a process of oxidation.

JAMES NIVEN.

Cocoanut as a Tænicide.—Parisi, of Athens, reports several cases in which the endocarp of the cocoanut acted as an efficient tænicide. No preparatory treatment is necessary. The patient drinks the "milk," and then eats the endocarp of the nut. This is followed by a feeling of abdominal uneasiness and pain, slight diarrhœa, and finally the expulsion of the tænia after some hours.—*Jour. Amer. Med. Assoc.*, March 9.

Tincture of Iodine a Cure for Warts.—Dr. Imossi, of Gibraltar, has been treating warts with internal doses of tincture of iodine in ten cases, all of which resulted favorably. The dose given was ten drops in half a glass of water, twice a day. A slight emaciation of the patient will be regained as soon as the treatment is discontinued.—*Med. News*, Aug. 24, 1889.

MAXIMAL DOSES OF NEW REMEDIES.

The following table, which contains also some remedies that have been used in the United States for a number of years, is reprinted from *Merck's Bulletin* for June, 1889, and is stated to have been compiled principally from B. Fischer's *Neuere Arzneimittel* (Berlin, 1889) and from Professor Aurep's and Dr. Voromikin's *Russian Medicinal Agenda*, 1889, I.

MEDICAMENT.	Maximal Adult Dose, by Mouth.			
	SINGLE.		DAILY.	
	Grams.	= about Grains.	Grams.	about Grains.
Acid, Cubebic	1	15	5	75
" Hydrobromic, diluted (10 per cent.)	*forty drops.*		*one hundred drops.*	
" Iodic	0·3	4½	1·2	18
" Per-osmic	0·015	¼	0·05	¾
" Sclerotic	0·06	1	0·25	4
" Valerianic	*ten drops.*		*forty drops.*	
Adonidin	0·006	$\frac{1}{10}$	0·03	½
Agaricin	0·015	¼	0·05	¾
Allyl Tri-bromide	*eight drops.*		....	....
Aloin	0·3	4½	0·6	9
Amylene Hydrate	4	60	8	120
Anemonin	0·03	½	0·1	1½
Antifebrin	1	15	3	45
Apiol, crystallized (*solid* Parsley-camphor)	1	15	4	60
Apo Codeine	0·03	½	0·08	1¼
Apo-Morphine Hydrochlorate	0 01	⅙	0·05	¾
Arbutin	1·	15	4	60
Arsenic Bromide	0·01	⅙	....	....
" Iodide	0·01	⅙	....	....
Asparagin	0·1	1½	0·3	4½
Aspidospermine Hydrochlorate	0·003	$\frac{1}{20}$	0·006	$\frac{1}{10}$
Baptisin	0·03	½	0·1	1½
Bebeerine Sulphate	3	45	10	150
Benzene (Benzol)	1	15	6	90
Berberine Hydrochlorate	0·06	1	0·25	4
Boldo-glucin	4	60	12	180
Butyl-chloral Hydrate	1	15	4	60
Cannabine Tannate	1	15	2	30
Cannabinon.	0·1	1½	0·3	4½
Carbon Bi sulphide	*ten drops.*		*forty drops.*	
" Tri chloride	0·5	7½	2	30
Cerium Oxalate	0·3	4½	1	15
Chrysarobin	0·005	$\frac{1}{12}$	0·015	¼
Cocaine Hydrochlorate	0·15	2¼	0·5	7½
Colocynthin	0·4	6	0·8	12
Coniine Hydrobromate	0·005	$\frac{1}{12}$	0·03	½
Convallamarin	0·06	1	0·3	4½
Cotoin	0·08	1¼	0·5	7½
Daturine	0·001	$\frac{1}{64}$	0·003	$\frac{1}{20}$
Duboisine	0·001	$\frac{1}{64}$	0·003	$\frac{1}{20}$
Erythrophleine Hydrochlorate	0·01	⅙	0·3	½

MEDICAMENT.	Maximal Adult Dose, by Mouth.			
	SINGLE.		DAILY.	
	Grams.	= about Grains.	Grams.	= about Grains.
Ethyl Bromide	*twenty drops.*		....	....
" Iodide	*twenty drops.*		....	....
Ethyl-oxy-Caffeine	0 65	10	2	30
Euonymin (Evonymin--the pure *Resinoid!*)	0·5	7½	1	15
Fluid Extract: Boldo	1	15	3	45
" " Cabbage-tree Bark (from *Andira inermis*)	2	30	6	90
" " Cascara Amarga (Honduras-bark)	4	60	10	150
" " " Sagrada (Chittem-bark)	4	60	10	150
" " Damiana (Turnera aphrodisiaca)	5	75	20	300
" " Golden Seal (Hydrastis)	2·5	38	10	150
" " Grindelia robusta	3	45		
" " Kava-Kava (Piper methysti-			20	300
cum)	0·65	10	2	30
Fluid Extract: Lily of the Valley (Convallaria majalis)	0·5	7½	1·5	23
" " Piscidia (Jamaica Dogwood)	5	75	15	225
" " Witch-hazel (Hamamelis)	10	150	....	....
Fuchsin	0·25	4	0·5	7½
Gelsemine Hydrochlorate	0·005	1/12	0·015	¼
Guaiacol	0·1	1½	0·5	7½
Hasheesh	0·1	1½	0·3	4½
Helenin (*solid* Elecampane-camphor)	0·3	4½	1	15
Helleborein	0·03	½	0·12	2
Homatropine Hydrobromate, or, Sulphate	0·03	½	0·25	4
Hydroquinone (Hydrochinone)	0.8	12	1·5	23
Hyoscine Hydrochlorate	0·001	1/64	0 003	1/20
Hyoscyamine Sulphate	0·001	1/64	0·003	1/20
Hypnone (Aceto-phenone)	0·5	7½	1·5	23
Ichthyol	1	15	4	60
Iodine Tri-chloride	0·012	1/5	0·08	1¼
Iodol	0·2	3	1	15
Iridin	0·2	3	0·5	7½
Kairin	1	15	4	60
Menthol	1	15	5	75
Mercur-Thymol Acetate	0·01	1/6	0·12	2
Mercury Bi-chloride, peptonized	0·03	½	0·1	1½
" Cyanide	0·03	½	0·1	1½
" Form-amidated	0·03	½	0·1	1½
" Phenate (Carbolate)	0 03	½	0·1	1½
" Salicylate	0·03	½	0·1	1½
" Tannate	0·1	1½	0·3	4½
Methylal	4	60	8	120
Naphthalene	1	15	4	60
Naphthol, Beta-	1	15	4	60
Nickel Bromide	0 5	7½	1·5	23
Nitro-glycerin	0·001	1/64	0 005	1/12
Par-aldehyd	4	60	....	....
Parthenicine	0·2	3	1	15
Pelletierine Sulphate; or, Tannate	0·5	7½	5	75

MEDICAMENT.	Maximal Adult Dose, by Mouth.			
	SINGLE.		DAILY.	
	Grams.	= about Grains.	Grams.	= about Grains.
Pereirine Hydrochlorate	1·5	7½	2	30
Phen-acetin (para-Acet-phenetidin	1	15	2	30
Picrotoxin	0·006	1/10	0 02	⅓
Piperine	0·6	9	1·2	18
Podophyllo-toxin	0·02	⅓	0·06	1
Potassium Osmate	0·015	¼	0·05	¾
Propylamine, *so-called*, see Tri-methyl-amine	……	……	……	……
Pyridine	……	……	*twenty-five Drops.*	
Quinoline (Chinoline) Tartrate	2	30	6	90
Resorcin	3	45	10	150
Salicin	2	30	10	150
Salol	2	30	10	150
Silver Cyanide	0·005	1/12	0·02	⅓
" Iodide	0·02	⅓	0·06	1
Solanine	0·1	1½	0·5	7½
Sparteine Sulphate	0·03	½	0·1	1½
Strophanthin	0·0002	1/333	0·0004	1/166
Sulphonal	4	60	8	120
Terpin Hydrate	0·3	4½	1	15
Terpinol	0·3	4½	1	15
Thalline Sulphate	0·5	7½	1·5	23
" Tartrate	0·5	7½	1·5	23
Tincture Strophanthus	1·5	23	5	75
Tri-methyl-amine (*erroneously called* "Propyl-amine")—10-per-cent. *Solution*	3	45	10	150
Urethane	5	75	……	……
Xylene (Xylol)	2	30	……	……

N. B.—All the above-stated *sizes* of dose are calculated for administration *by mouth* only.

REDUCTION OF TARTARIC ACID.[1]

By M. Ballo.

Neither Liebig's nor Baeyer's theory of the formation of sugar in plants gives any explanation of the part played by the iron which is present in chlorophyll. In investigating the action of this metal on vegetable acids, the author found that tartaric acid, when warmed with ferrous sulphate, is converted into an acid which he names isoarabinic acid, on account of the sticky nature of solutions of the calcium salt. Tartaric acid (1 part) and ferrous sulphate (1 part) are dissolved in water (about 2 parts) and the solution warmed on the water-bath; after a short time a greenish-yellow precipitate, consisting chiefly of the iron salt of an acid containing more oxygen than isoarabinic acid, is formed. The whole is then evaporated with constant stirring, until the residue solidifies on cooling, and is then extracted with strong alcohol. The alcohol is evaporated, the residue dissolved in water, the solution neutralized with milk of lime, filtered, evaporated to a syrup, and the calcium salt which separates dissolved in water and decomposed with the calculated quantity of oxalic acid. The filtered solution is concentrated, mixed with alcohol, separated from any undecomposed salt, and again concentrated and mixed with alcohol and ether. After keeping for a long time, a crystalline compound, which the author names isoarabinic acid hydrate separates, and the filtered solution, on evaporation, yields isoarabinic acid.

---

[1] *Ber.* xxii, 750—754; reprinted from *Jour. Chem. Soc.*, July 1889, p. 693.

Isoarabinic acid, $C_6H_{10}O_5$, is a thick, almost colorless syrup, which is miscible with water in all proportions, and when burnt gives off a smell of burnt sugar. It is dextrorotatory, and its specific rotatory power is $[\alpha]_D = +20°$, but it does not reduce Fehling's solution. The *potassium* salt, $C_6H_9O_5K$, is anhydrous, and crystallizes well. The *calcium* salt, $(C_6H_9O_5)_2Ca + 9H_2O$, dissolves in water, forming a sticky solution, from which it crystallizes moderately easily; it loses some of its water at 100—120°, the remainder only at a temperature so high (above 140°) that the salt is partially decomposed. It reduces ammoniacal silver solution, and readily decomposes both in solution and in the dry state, being converted into a basic salt, $(C_6H_9O_5)_2Ca,CaO + 8H_2O$. The latter is a colorless powder, and is insoluble in water, but it dissolves in potash, and is reprecipitated on boiling the solution; it reduces ammoniacal silver solution. When a solution of the calcium salt is mixed with a solution of lead acetate, a yellow precipitate, consisting principally of the salt, $(C_6H_9O_5)_2Pb$, is formed, and a colorless substance, consisting principally of the basic salt, $(C_6H_9O_5)_2Pb,2PbO$, separates from the filtrate after some time.

Isoarabinic acid hydrate (see above) has probably the composition $C_6H_{12}O_6$; it does not reduce Fehling's solution.

These results show that substances, isomeric with the carbohydrates, and other compounds richer in oxygen, are formed by the action of ferrous sulphate on tartaric acid. The quantity of ferrous sulphate employed may be as little as one-tenth the weight of the tartaric acid without influencing the results, but the author believes that direct sunlight may have some appreciable effect on the reaction. These facts are evidence in favor of Liebig's theory of the formation of sugar in plants. It was frequently observed that the crude solutions of isoarabinic acid contain reducing substances which, however, disappeared on further investigation; this fact seems to indicate that it is possible to obtain sugar synthetically from tartaric acid or other vegetable acids.

EDITORIAL DEPARTMENT.

Pharmacists and the Medical Profession.—The delegation sent by the American Pharmaceutical Association to the American Medical Association, at the recent meeting in Newport, Rhode Island, to confer upon subjects of mutual interest to both professions, were warmly received by the Medical Association.

The following resolutions were passed on the third day of the meeting:

Whereas, the American Pharmaceutical Association has appointed a Committee of Conference, and sent a delegation to this Association;

Resolved, that this Association extends a cordial greeting to the representatives of the American Pharmaceutical Association, and invites them to a seat on the platform;

Resolved, that a Committee of Conference be appointed to meet the Committee of the American Pharmaceutical Association for the consideration of subjects of mutual interest and benefit;

Resolved, that this Committee report on the second day of the next annual meeting of this Association, the results of their conference, with such recommendations as they may deem advisable in the premises.

The Committee presented the claims of the National Formulary by personal solicitation, and secured favorable consideration for it.

The Committee representing the American Pharmaceutical Association were: Joseph P. Remington, Chairman; Charles A. Heinitsh, of Lancaster; Karl Simmon, of St. Paul; William M. Massey, of New York; William H. Cotton, of Newport.

Messrs. Heinitsh and Simmon having left for San Francisco, Messrs. Samuel A. D. Sheppard and J. W. Colcord, of Boston, were appointed substitutes.

The Committee of Physicians to confer jointly with the delegation are as follows: Dr. Frothingham, of Ann Arbor; Dr. Culbertson, of Cincinnati; Dr. Woodbury, of Philadelphia; Dr. Love, of St. Louis; and Dr. Shattuck, of Boston.

It is believed that some plan will be devised which will prove beneficial, by providing for regular conferences to be held at stated times by these two representative national organizations.

The Pennsylvania Pharmacy Board held an examination at Altoona, July 9, when twenty-five candidates applied for certificates as registered pharmacists, and eleven as qualified assistants. Eight of the former and six of the latter were successful.

The Hanbury Medal is awarded every two years for prominent researches connected with the natural history and chemistry of drugs. The awarding jury consists of the Presidents of the London Chemical Society, the Linnean Society, the Pharmaceutical Society and the British Pharmaceutical Conference, and of a pharmaceutical chemist nominated by the two last named presidents.

The first medal was awarded in 1881 to Prof. F. A. Flückiger of Strassburg. The subsequent awards were made in 1883 to John Eliot Howard, whose name is intimately connected with the history of the cinchonas; in 1885 to Prof. George Dragendorff of Dorpat, well known for the scientific investigation of medicinal plants, and in 1887 to Professor Wm. Dymock, Brigade Surgeon in Bombay, for his long continued prominent labors relating to the East Indian materia medica.

During the present year the honor has been bestowed upon Dr. Gustave Planchon, Professor of Materia Medica in the École supérieure de Pharmacie of Paris, who is the author of a valuable work on Materia Medica, has edited, after Guibourt's death, the Histoire Naturelle des drogues simples, and has enriched literature by numerous papers on various drugs embodying his researches.

THE SEVENTH INTERNATIONAL PHARMACEUTICAL CONGRESS has at last been called to meet in the city of Milan during the early part of September, 1890. At the sixth congress, which was held in Brussels in 1885, it was decided to convene the next one in 1888; but like the preceding and several previous congresses it was deemed inopportune to let it take place precisely at the time originally fixed. The causes for this delay do not appear to have been made public, and no light has been thrown on it by the recent publication (*Journal de Pharmacie d'Anvers*, June) of the letters addressed by the executive officers of the Brussels Congress to the Lombardy Pharmaceutical Association. This body, it appears, early in 1888, had secured the support of the Italian government and of the Milan city authorities in favor of the project; but owing to lack of time for making all the requisite preparations for a meeting in the same year, decided to postpone it until 1889. But since it was found that during the international exposition now in progress in Paris several international meetings would be held there, in which pharmacists are especially interested (AM. JOUR. PHAR., July, p. 383), it was deemed best to further postpone the convening of the seventh pharmaceutical congress.

The Pharmaceutical Association of Lombardy has appointed a committee of organization, composed of about thirty of prominent Italian chemists and pharmacists, among others Ciamician, Daccomo, Guareschi, Mosca, Pavesi and Spica. Professor Stanislao Cannizzaro is president of this committee; the secretaries are Dr. Arturo Castoldi and Venturini Vittorio.

The following will be admitted as members of this congress: *a.* professors of universities, polytechnic schools and colleges; *b.* professors of physical and natural sciences of any school; *c.* pharmacists and chemists delegated by pharmaceutical associations or by sanitary authorities; *d.* members of sanitary councils or boards; *e.* assistants in institutions, laboratories or cabinets devoted to physical and natural sciences, medicine or pharmacy; *f.* chemists, directors and assistants of municipal laboratories, agricultural stations, and of all laboratories for the public service; *g.* proprietors and directors of chemical industries and chemists attached to such industries.

Those intending to participate are requested to inform the committee of their intention, if possible, before November 30th next. Communications on subjects for discussion or research are invited, with the view of preparing the program, which will be issued later. Adherents to the congress will forward the sum of 10 francs, and will be furnished with the badge, la marque de Congressiste.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Handbuch der praktischen Pharmacie, für Apotheker, Drogisten, Aerzte und Medicinal-Beamte. Bearbeitet von Dr. H. Beckurts, Professor in Braunschweig, und Dr. Bruno Hirsch, Apotheker in Berlin. Stuttgart: Ferd. Enke, 1889.

Handbook of practical pharmacy for apothecaries, druggists, physicians and medical officers.

This meritorious work is now before us completed. It forms two good sized octavo volumes of 733 and 721 pages. When the earlier fascicles appeared we commented upon the work in detail (see Amer. Jour. Phar., 1887, 378 and 543), and we have but very little to add now, except that all expectations have been fully realized. As stated before, the second part of the work promised to become a kind of universal pharmacopœia, inasmuch as it contains a compilation of the requirements of a number of modern pharmacopœias. It was but natural to expect that the authors should add comments from the rich mines of their own experience, and this has been copiously done, not only with strictly pharmacopœial drugs and preparations, but likewise with a number of the recently introduced medicaments.

The third part contains more than thirty tables, useful for reference, and the last 75 pages are occupied with the full and complete index, facilitating the use of this work, which will be of great value to all conversant with the German language.

Mittheilungen aus dem pharmaceutischen Institute und Laboratorium für angewandte Chemie der Universität Erlangen, von A. Hilger. München; 1889, I, II, 8 vo, pp. 180 and 309.

Contributions from the pharmaceutical institute and laboratory for applied chemistry of the university of Erlangen.

These pamphlets give an account of a number of researches undertaken by Prof. Hilger and some of his pupils on subjects connected with the sphere designed for the laboratory. Investigations on the composition and alteration of rocks, the absorbing power of soils, etc., are found in the first number; while the essays in the second number are on pharmaceutical, hygienic and forensic subjects, like foreign coloring matters in wine; inversion of saccharose; development of huckleberry and fermentation of its juice; solubility of alkaloids in xylol and in absolute ether; detection of cyanogen compounds, of opium, etc. Many new and little known facts are presented in these investigations.

Etude historique sur les Extraits Pharmaceutiques comprenant la description des divers procédés et appareils ayant servi à l'extraction des principes actifs des végétaux et à leur concentration, suivie d'une double table bibliographique, par Adrian, Pharmacien &c. Paris: Octave Doin. 1889, 8vo., pp. XVI, and 731.

Historical study on the pharmaceutic extracts, embracing the description of the different processes and apparatus for the extraction of the active principles of plants, and for their concentration, followed by a double bibliographical table.

The importance of extracts as pharmaceutical products has been recognized at an early date, and much attention has always been paid to their preparation. With the gradual perfection of methods and apparatus this importance has not been diminished. In the numerous essays devoted to this class of medicinal agents, which have appeared from time to time, we frequently meet with historical reviews of a portion of the work previously done in the same direction; but even such reviews rarely trace the subject matter to its original conception. In the work before us the author aims at covering the entire field of the preparation or manufacture of extracts from the earliest time to the present, and to trace, step by step, the improvements which have been introduced in the processes as well as in the utensils and apparatus. The whole subject is treated from the historical standpoint alone, the first part being devoted to the processes of evaporation, followed by the methods and apparatus used for the exhaustion of plants. Although it would seem that the latter should be considered first, since exhaustion must precede the operation of concentration, the author has chosen the order indicated, because much attention has originally been given to evaporation under various conditions, before any material change was made in the methods of extraction. The third part treats of the employment of low temperatures (freezing) in the preparation of extracts; and the following of the preservation of extracts in their original condition and quality, so as to avoid changes incidental to their drying out, absorption of moisture, moulding, fermentation, etc. The last chapter is devoted to preparations peculiar to British and American pharmacy, namely to liquid extracts, fluid extracts and abstracts. Under each chapter the chronological order is preserved as much as possible without, however, sacrificing clearness in the consideration of the gradual, and often times slow, perfection of the various methods and apparatus.

It will be seen from the foregoing that the book is a unique one, and we may add that it is a very valuable contribution to pharmaceutical literature, more particularly to the history of pharmacy. The text is illustrated with more than one hundred wood cuts of implements and apparatus, among them a number which have been devised by the author during his prolonged pharmaceutic experience, or which are in use at the laboratory of Courbevoie.

A very valuable addition to the work—or perhaps more properly part of it—consists of bibliographical tables, the one arranged alphabetically, the other chronologically, of publications treating of the different subjects to which the work is devoted. Commencing with the year 1471 and ending in 1889, these tables have been prepared with great care, so that, probably, few only of what may be considered the more important essays have been omitted; they contain, in each case, the full title, name of author, place and date of publication. While the literature of every nation has been thus collated, essays from Great Britain and the United States, besides France, are particularly numerous during the past thirty years, which is due to the attention paid here to percolation, and to the extensive use of fluid extracts.

The make-up of the work is unexceptional; but few errata have escaped the author's notice, most of them being corrected on page xvi. The work will be found both important and useful by those interested in the history of pharmacy.

Orthosulphobenzoic Acid and some of its derivatives. By A. R. L. Dohme. Baltimore: 1889. Pp. 38.

A dissertation from Johns Hopkins University for the degree of doctor of philosophy. Incidental to the researches mapped out the author ascertained that commercial *saccharin* is not a uniform product, but contains only from 30 to 40 per cent. of benzoic sulphinide, while parasulphaminebenzoic acid forms from 50 to 60 per cent. of the commercial article, about 10 per cent. being various other derivatives.

Histologische und chemische Untersuchungen der gelben und rothen amerikanischen und einiger cultivirten Java-Chinarinden der Sammlung des Dorpater pharmaceutischen Institutes. Von Eugen Wilbuschewicz, Dorpat: 1889. Pp. 80.

Histological and chemical investigations of the yellow and red cinchona barks, of American origin or cultivated in Java, and contained in the collection of the pharmaceutical institute at Dorpat.

A dissertation from the University of Dorpat for the degree of master of pharmacy. The aim of the histological examination was to ascertain the botanical origin of the numerous samples of cinchona bark, mostly received under commercial names. Twenty-one of the barks were also chemically examined.

Ueberdie Einwirkung von Säurechloriden auf Phenolaether. II. Zur Kentniss des Bors. Von Henry C. C. Maisch. Göttingen, 1889, pp. 42.

On the action of aci-chlorides upon phenol-ethers. II. Contribution to the knowledge of boron.

A dissertation from the university of Göttingen for the degree of doctor of philosophy. The first part treats upon the effect of acetyl-chloride and benzoyl-chloride upon anisol, phenetol and analogous compounds. The second part contains researches on the advantageous preparation of boron and its chloride.

A Manual of Chemistry for the use of medical students. By Brandreth Symonds, A. M., M. D., etc. Philadelphia: R. Blakiston, Son & Co., 1889, pp. 154. Price $2.00.

The author having, for several years, prepared students in this branch, both for their degrees and for entrance into the government medical services, states that the book is not designed to be a medical chemistry. It is a brief recapitulation of the most important chemical facts, particularly of those applying to medicine and hygiene; hence water, air, urine, etc., receive special attention. If properly used, merely as a remembrancer, the little work will serve quite a useful purpose.

THE AMERICAN
JOURNAL OF PHARMACY.

OCTOBER, 1889.

ON THE ACTION OF ACID CHLORIDES ON PHENOL-ETHERS.

By Henry C. C. Maisch, Ph.G., Ph.D.

Some years ago Friedel and Crafts (*Comptes rendues* (1877) lxxxiv 1392, 1450, lxxxv 74, etc.) described a synthetical reaction which has since then been employed in a great number of cases. The reaction is based on the following: a halogen derivative of the fatty group, in which the halogen is bound to a carbon atom, acts on benzol or its derivatives, in the presence of aluminium chloride, in such a manner that hydrochloric acid is liberated and a new body, either a hydrocarbon, a ketone or an acid derivative is formed. Until a few years ago it was thought that the reaction would only take place if one of the reacting substances were a hydrocarbon; but Leuckart and M. Schmidt (*Ber.*, xviii, (1885), p. 2338) showed this not to be the case as the hydrochloric acid addition product of phenylcyanate $Cl\text{-}CO\text{-}NHC_6H_5$ reacts with hydrocarbons as well as with phenolethers in presence of aluminium chloride. Continuing in this line of research, Gattermann & Hess (Liebig's Ann. 244, p. 61), used the chloride of the simple carbonic acid $Cl\text{-}CO\text{-}NH_2$ and obtained amides. I am greatly indebted to Prof. L. Gattermann for suggesting to me the investigation of the chlorides of the carbon acids in their effects upon the phenolethers.

These ethers were prepared according to the general method by the action of potassium hydrate in alcoholic solution on a mixture of phenol and a halogen derivative of the group to be introduced. With the naphthol ethers a simpler and cheaper method was found to answer all purposes. The latter is the action of 10 parts concentrated sulphuric acid on a solution of 25 parts of α- or β- naphthol in 20 parts methylic or ethylic alcohol at 135-140°C. When using methylic alcohol it is best to work under pressure to prevent loss.

Method for the preparation of the ketones.—To a solution of 1 part phenolether and 2 parts acid chloride[1] in 4 parts carbon bisulphide, 2 parts of finely powdered anhydrous aluminium chloride is gradually added. The latter is dissolved by the liquid until about one-half has been added, when a heavy oil falls to the bottom. The reaction is accompanied by a copious elimination of hydrochloric acid gas, which usually takes place without applying artificial heat; but should this not be the case, the flask is slightly warmed on a water-bath. As soon as all the aluminium chloride has been added the supernatent carbon bisulphide is poured off and, while cooling, the residue is decomposed by water. The liquid is acidified with hydrochloric acid in order to dissolve the precipitated basic aluminium compound and the ketone taken up with ether. This solution is then washed with water and a dilute alkaline solution until perfectly neutral, dried over anhydrous calcium chloride and the ether recovered. The residuary oil is subjected to fractional distillation, the colorless portion distilling above 200° C. is collected, brought into a freezing mixture and the crystalline compound subjected to pressure between absorbent paper or plates. The further purification is accomplished by crystallization from ether, dilute alcohol or glacial acetic acid.

The oxidation, by which the corresponding acids were obtained, was carried out according to the method of Weith (Ber. vii., 1874, 1057) by means of alkaline permanganate of potassium solution. By complete oxidation of the side group I obtained the carbon acids and by interrupting the action as soon as the oil drops had disappeared, the corresponding glyoxylic acids were usually obtained in such an impure state that an analysis could not be made except in a few instances. The acids were recognized by the following very characteristic reactions: 1, with active benzol and concentrated sulphuric acid (claisen); 2, by fusing with dimethylaniline and zinc chloride (malachite green).

1. Action of acetylchloride.

Anisol yields a body which in a pure state melts at 38-39°C. and distils at 258°C. This compound *p*-acetylanisol, crystallizes from ether in short four-sided prisms. Olivieri (*Gazetta Chimica Italiana* XIII, p. 275) obtained a body, not solidifying at —15°C. and distilling between 220 and 225°C., to which he ascribed the same formula. It was probably the body here described but in a rather impure state as I found that at summer temperature it was almost impossible to obtain the acetylanisol pure.

---

[1] In the reaction with benzoylchloride the theoretical amount is best used.

Phenetol.—The acetyl-phenetol crystallizes from ether in hexagonal plates melting at 60-61°C. and distilling above 260°C.

Resorcindiethyl ether.—The ketone crystallizes from alcohol in small and usually pinkish crystals which melt at 67-68°C.

a-Naphthylmethyl ether yields a ketone, crystallizing from ether in colorless hexagonal plates which melt at 71-72°C. and distil above 300°C.

a-Naphthylethyl ether.—The acetyl compound crystallizes in small prisms which melt at 78-79°C. and distil above 300°C.

β-Naphthylmethyl ether.—The ketone crystallizes from dilute alcohol in colorless needles, melting at 57–58°C.

β-Naphthylethyl ether—Yields a ketone, crystallizing from ether in colorless prisms, melting at 62-63°C., and distilling above 360°C.

2. Action of benzoyl chloride on—

Anisol.—The body here obtained was previously prepared in a different manner by Rennie (*Jour. Chem. Soc.*, 1882, p. 220). The crystals melt at 61–62°C., and distil above 300°C.

Phenetol.—The benzoyl phenetol melts at 38–39°C., and distils above 300°C.; it was crystallized from glacial acetic acid.

a-Naphthylmethyl ether.—The ketone here obtained melts at 74-75°C. and is decomposed by distillation.

3. Derivatives obtained from the first group:

From acetylanisol.—1. By action of bromine water, a monobromine substitution product, melting at 85–86°C.

2. By action of nitric acid, a body very likely belonging to the nitrosacyls studied by Holleman (*Ber.*, xx. (1887) 3359; xxi. (1888) 2835), and melting at 139°C.

3. The ozidation product, *anisic acid,* melting at 185°C., and the corresponding glyoxylic acid in an impure state.

From acetylphenetol.—The oxidation product, *p*-oxethyl benzoic acid; melts at 195°C., and the allied glyoxylic acid, at 53–54°C.

From acetyl-a-naphthylmethyl ether.—Oxidation yielded a carbon acid, which had been previously described by Gattermann & Hess (*Lieb. Ann.*, 244, p. 61.) The corresponding glyoxylic acid was obtained in an impure state.

From Acetyl-a-naphthylethyl ether.—The carbon acid had also been prepared by Gattermann & Hess (*l. c.*)

From Acetyl-β-naphthylethyl ether.—The glyoxylic acid melts at 131-136°C. under decomposition. The corresponding carbon acid could not be obtained.

A NOTE ON THE TITRATION OF AMMONIUM CARBONATE.

By George M. Beringer, Ph. G.

The U. S. Pharmacopœia states that "To neutralize 2.616 gm. of Carbonate of Ammonium should require 50 cc. of the volumetric solution of oxalic acid." In the Digest of Criticisms on the U. S. Pharmacopœia, page 26, occurs the following statement: "In the volumetric test an error has crept in, 50 cc. of the oxalic acid solution require '2·95' Gm. of the salt (Nat. Disp. 178). According to Squibb, 2·616 gm. require between 39 and 40°Cc. of the acid solution (Ephemeris 698)."

Having occasion recently to examine a number of samples of commercial carbonate of ammonium, my attention was attracted by the discrepancy of these statements.

The Pharmacopœia states the formula of ammonium carbonate as $NH_4HCO_3NH_4NH_2CO_2$. This formula, based upon the classical researches of Edward Divers, M. D., the combinations of carbonic anhydride with ammonia and water (Journ. London Chem. Soc., 1870, page 171), considers the commercial carbonate as a mixture of one molecule each of acid carbonate and carbamate, and is, I believe, the formula recognized by all the more recent text-books. Upon dissolving this salt in water, the carbamate is changed to normal carbonate; the reaction being represented by the equation

$$(NH_4)HCO_3(NH_4)NH_2CO_2+H_2O=(NH_4)HCO_3(NH_4)_2Co_3.$$

Neutralizing this by oxalic acid as in the officinal volumetric test, the reaction would be represented by the equation

$$2(NH_4HCO_3(NH_4)_2CH_3)+3H_2C_2O_42H_2O=3(NH_4)_2 C_2O_4+4CO_2+10H_2O,$$

or accepting the officinal formula and molecular weight (157), and calculating the weights, 378 grms. of oxalic requires 314 grms. of carbonate of ammonium for saturation. Consequently 3·15 grm. oxalic acid, the amount contained in 50 cc. of the normal oxalic solution would neutralize 2·616 grms. ammonium carbonate, and the pharmacopœial requirement is *correct for the officinal salt.*

The National Dispensatory (page 177) states the salt formerly in the market was represented by the formula $2NH_4HCO_3.NH_4NH_2CO_2$ molecular weight=236.

The reaction of such a salt with oxalic acid would be represented by the equation—

$$2NH_4HCO_3.NH_4NH_2CO_2+H_2O+2H_2C_2O_4,2HO=2(NH_4)C_2O_4+3CO_2+5H_2O,$$

236 grm. neuralizing 252 grm. of oxalic acid. Consequently 3·15 grm. oxalic acid, the amount contained in 50 cc. of normal solution, would neutralize 2·95 grm. of a salt of this composition.

Much of the commercial carbonate of ammonium does not answer the requirements of the Pharmacopœia. Dr. Divers (loc. cit., page 240) states that he had found one exception to the uniformity of the commercial carbonate. This on analyzing gave numbers nearly identical with those of the acid carbonate. Prof. Bridges (AMER. JOUR. PHAR., 1874, page 540) likewise called attention to this salt existing in a commercial carbonate. More recently, Kraut (*Archiv d. Pharm.*, 1885, page 21) noticed the same. My own experience leads me to believe that considerable of this acid carbonate has been put on the market by an American manufacturer; perhaps unintentionally, from a desire to make a solid carbonate which would keep well. Four samples recently examined gave the following results, two determinations being made:

	Quantity taken.	Normal Oxalic Acid required.	
No. 1, American	2·616 grm.	35·3 cc.	34·6 cc.
No. 2, American	2·616 grm.	41·4 cc.	41·0 cc.
No. 3, American (Squibb's).	2·616 grm.	50·0 cc.	49·5 cc.
No. 4, English	2·616 grm.	49·0 cc.	48·7 cc.

Sample No. 1 was a very hard, clear salt, with but a faint odor of ammonia, and on exposing a piece to the air for several days the odor of ammonia was lost, the salt remaining nearly as translucent as before exposure. From its saturating equivalent, 2·616 grm. neutralizing 34·6 cc. normal oxalic solution, I believe it to have been nearly pure acid carbonate (2·616 grm. acid carbonate requires 33·11 normal oxalic acid solution.) Samples No. 1 and No. 2 were not free from empyremnatic substances, No. 1 having particularly a strong urine-like odor.

The volumetric estimation of carbonate of ammonia can not be accomplished by direct titration with the oxalic acid solution, owing to the decomposition of the carbonate on heating to expel the carbonic anhydride liberated. The method used by the writer was practically the same as that described by Dr. Squibb (*Ephemeris*, 698.) The sample for examination was obtained by selecting a piece of salt free from the outer white deposit of acid carbonate and making a cleavage through the centre of the piece, so as to obtain a section containing the several layers. This was quickly powdered, and the desired quantity weighed and placed in a beaker with 50 cc. distilled, the beaker covered with a watch crystal or plate until the salt is dissolved and then carefully run in 55 or 60 cc. of the oxalic acid solution, raising the cover sufficiently to admit the end of the pipette. After the effervescence has ceased, warm the solution until the CO_2 is entirely dispelled, and then titrate with volumetric soda solution, previously standardized with the oxalic acid solution, using the same indicator as used in the titration of the ammonium carbonate. By deducting the number of cc. of soda solution required from the number of cc. of oxalic solution used, the number of cc. of oxalic acid solution required by the ammonium carbonate is indicated. As an indicator, I prefer litmus solution, prepared by first extracting the litmus with 80 per cent. alcohol, and then dissolving in water and adding to the filtered solution a few drops of nitric acid, until the bright-blue is changed to a purplish tint.

It is apparent that much of the commercial salt is unfit for pharmaceutical purposes, although excellent in appearance. The importance of the volumetric test can not be overestimated. A definite salt answering the pharmaceutical requirements, can be obtained by resublimation and, no doubt, if the pharmacists would demand a a resublimed carbonate of ammonium the manufacturers would soon meet the demand. According to Dr. Divers (loc. cit. 265) "It appears that when the normal carbonate is distilled slowly enough, the products are carbamate and water; and that when the acid carbonate is similarly distilled the product is the acid carbonate again; but that when either the normal, the acid or the half acid carbonate is distilled faster than the whole of the products of distillation can condense in the receiver, partial condensation takes place in such a way that the carbonate of commerce is formed.

OIL OF MAIZE.

BY CHARLES EDWARD BOWERS, PH. G.

Abstract from Thesis.

To extract the oil from the seed, corn was taken in the different stages of its growth to ascertain at what age it contains the largest amount of oil. The corn was carefully dried after which it was removed from the cob, reduced to a coarse powder and percolated with petroleum ether to remove the oil. The youngest specimen tried contained one per cent. of its weight of oil. The amount gradually increased with the age of the corn until the maximum was reached in that which was allowed to fully ripen and dry upon the stalks. The amount yielded by such corn was 3.16 per cent.

The oil is said to reside entirely in the embryo or germ of the corn, and to ascertain if such be the case a portion of the corn was carefully deprived of its embryo, coarsely powdered and percolated with petroleum ether, no oil was obtained. The germs on the other hand freed from all integuments and treated in the same manner yielded 22 per cent.

As obtained the oil was of a pale yellow color, and had a somewhat thicker consistence than either cottonseed or olive oils. The odor was slight but peculiar; its taste not unpleasant, bland and oleaginous; its specific gravity .917. It is a fixed oil belonging to the group of non-drying and is well adapted for lubricating purposes. It is soluble in all proportions in ether, bi-sulphide of carbon, chloroform, and benzin; very sparingly soluble in 95 per cent. alcohol, forming a milky mixture when shaken with that body which separates on standing into two layers, both of which are perfectly transparent. The oil readily saponifies with so weak an alkali as lime water, and with potassa or soda it forms a white soap. A thin layer of the oil exposed to the air for several weeks did not show any rancidity and to all appearances remained unchanged. In this respect it compares favorably with the oils of rape seed, olive, etc.

Upon strongly heating, the oil emits characteristic smoky, irritating and very disagreeable vapors, somewhat similar to those produced in the heating of cottonseed oil. It therefore would not be tolerated as an adulterant to lard, because the odor developed upon heating would certainly betray its presence. Lard itself is decomposed at high temperatures, but the odor produced is entirely distinct from that produced when oil of maize is associated with it.

It could not be used to adulterate olive oil, as it gives different results with all the tests for the identity of that body. With concentrated sulphuric acid it instantly darkens. Immersed in a freezing mixture of ice and salt, it did not deposit a granular substance and remained nearly transparent, but became very notably thicker in consistence, so much so that it was scarcely mobile. The probability is that it consists largely of olein.

It is more easily absorbed by the skin than cottonseed or olive oils, and is an excellent vehicle for external applications. It also dissolves camphor with more facility than those oils.

Numerous preparations of the Pharmacopœia were made by substituting oil of maize where cottonseed oil is directed, to ascertain whether it is capable of replacing that body. The results were very satisfactory in every case. In some instances its superiority over cottonseed oil was very well marked. In the preparation of ammonia liniment this feature was most prominent. The oil readily saponified on the addition of the ammonia water, forming a smooth, creamy mixture, which did not become curd-like or separate on standing, as is frequently the case with the officinal liniment of ammonia. Examined at the expiration of two months, no changes could be observed, and it was apparently as perfect as when first made.

The oil could be adapted to table use as a dressing for salads, etc., and could readily take the place of those oils now used for such purposes.

Taken internally in the dose of a fluidounce, it gives no medicinal effects other than those possessed by olive oil.

It is said that this oil is already an article of commerce in some of the western states. It is a by-product in the manufacture of starch. Where corn is used as the source of that substance, it becomes an object to get rid of the oil-bearing germs, and this is done by the aid of machinery, which separates the starchy portion of the corn in one direction and the germs in another. The germs are then freed from adhering integuments as far as practicable and subjected to the action of steam, after which the oil is removed by the aid of hydraulic pressure.

Sulfonal is recommended for night sweats by Dr. Boethrick, a dose of 0·5 gms. (gr.vijss) being usually sufficient, and its effect being noticed during the second night in less profuse perspiration.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph. G.

Identification of Tinctures.—L. von Itallie has published tests of identity for the following tinctures:

Tincture of Aloes.—If this tincture be agitated with ether, and to the separated ethereal solution water of ammonia added, a red-violet coloration results.

Tincture of Calumba.—The yellowish-green residue obtained by evaporating a little of the tincture is dissolved in dilute hydrochloric acid, and if to this solution is added a small quantity of chlorine or bromine water, a light-red color is produced.

Tincture of Cinchona.—Two grams are precipitated by solution of lead subacetate, filtered, evaporated, the residue dissolved in water, a few drops of sulphuric acid added, and again filtered. The filtrate is tested for quinine or quinidine by the thalleioquin test.

Tincture of Colchicum.—Three grams are evaporated, the residue dissolved in water, the solution filtered, the filtrate agitated with chloroform, and the chloroformic solution evaporated; the residue with nitric acid, will be colored violet, changing to brown, on addition of potassium hydrate solution, becoming orange colored.

Tincture of Digitalis.—Five grams are evaporated, 2 cc. water added, and precipitated with a small quantity of solution of lead acetate. After filtering the filtrate is agitated with chloroform, and to the residue, after the chloroformic solution has evaporated, is added a little sulphuric acid and a few drops of bromine water; a violet coloration appears.

Tincture of Gelsemium.—One gram is evaporated, 1 cc. acidulated water added, filtered, the filtrate rendered alkaline with water of ammonia and shaken with chloroform. Gelsemine remains upon evaporation of the chloroformic solution, which, with sulphuric acid and potassium bichromate, yields a red-violet color. The alkaline solution (after the removal of the chloroform solution) diluted with water possesses a blue fluorescence.

Tincture of Guaiac is colored blue by oxidizing agents; a blue color is also obtained upon addition of cupric sulphate and bitter almond water.

Tincture of Ipecac is evaporated, the residue taken up with acidulated water, filtered, made alkaline with potassium hydrate solution and shaken with ether. The residue from the ethereal solution gives a brown color, with a solution of ammonium molybdate in concentrated sulphuric acid, and upon the *immediate* addition of a drop of hydrochloric acid, a blue color soon appears.

Tincture of Jalap yields a residue turning red with sulphuric acid.

Tincture of Nux Vomica evaporated with dilute sulphuric acid gives a violet color; the residue treated with water, filtered, the filtrate made alkaline and extracted with chloroform, leaves a purified residue upon the evaporation of the chloroform, which with nitric acid is colored red, or with concentrated sulphuric acid and potassium bichromate, assumes a violet color.

Tincture of Quebracho, 5 grams are evaporated, the residue dissolved in acidulated water, filtered, rendered alkaline with potassium hydrate and agitated with chloroform; the chloroform residue is colored blue by sulphuric acid and potassium bichromate, or a red color is produced by boiling with dilute sulphuric acid and adding potassium chlorate.—(*Apoth. Ztg.*); *Rundschau*, 1889, 714.

The behavior of chloral hydrate toward glass is noticed by Ludwig Reuter in *Pharm. Centralhalle*, 1889, 477. A blue glass bottle containing chloral hydrate was sent him by a colleague; the crystals adhering to the sides of the bottle had an intense blue color. By dissolving these crystals in water and filtering, the coloring matter could be separated; the blue pigment was dissolved by chloral hydrate if the latter was melted by aid of a water-bath, but on addition of water was reprecipitated. The chloral hydrate obtained free from the coloring impurity (found to be due to traces of nickel, originally present in the smalt used in coloring the glass), answered all the requirements of the German Pharmacopœia, barring a slight residue obtained when dissolving in ether-alcohol and which residue was found to consist of formate. This mutual decomposition, so accidentally discovered, is of sufficient interest to warrant experiments made with glass of various kinds.

Distinctive tests for Acetanilid, Methacetin and Phenacetin.—The tests are first given and then the effect obtained by using the above substances. 1, 0·1 gm. with 1 cc. cold concentrated hydrochloric acid. 2, after observing the results of test 1, add one drop of concentrated nitric acid. 3, 0·1 gm. boiled with 1 cc. concentrated hydrochloric acid, allowed to cool, diluted with water and 3 drops of a 3 per cent. chromic acid solution added. 4, 0·1 gm. with 5-6 cc. cold concentrated hydrochloric acid and 1 cc. of the 3 per cent. chromic acid solution. 5, 0·1 gm. boiled with 1 cc. solution of potassium hydrate, allowed to cool and 5-8 drops of $\frac{1}{10}$ normal potassium permanganate solution added.

	I	II	III	IV	V
Methacetin.	soluble	slowly reddish brown	blood red.	immediately green.	green then yellowish brown.
Phenacetin.	insoluble.	slowly yellow.	blood red.	yellow, after a few minutes green.	dark green.
Acetanilid.	soluble, but re-precipitated.	colorless.	yellow.	yellow; only after some hours green.	dark green with disagreeable odor of carbylamin.

In this connection mention was also made of the *melting point of acetanilid*, commercial specimens melting at 111°, 112°, 113°, 114° and as high as 125°C. The melting point is stated by different authorities from 113° to 115°; the wide limits here recorded are produced by admixture of acettoluid.—E. Ritsert, *Pharm. Ztg.*, 1889, 546.

The color reaction for cocaine with resorcin, (see AM. JOUR. OF PHARM., 1889, 470) tried by a number of German pharmacists and chemists disclosed the fact that only one brand of cocaine hydrochlorate gave the blue color. Further investigation proved that the brand giving the test contained minute traces of nitrate as impurity, the quantity of which was so small that neither the indigo nor the ferrous sulphate test could be obtained. Instead of discovering a new reaction for cocaine salts Mr. Goeldner discovered a very sensitive

Reaction for nitrates carried out as follows: If to a solution of 0·01 gm. resorcin in 6-7 drops concentrated sulphuric acid be added 0·02 gm. of the substance containing a nitrate, a beautiful blue color is obtained which increases in intensity.—*Pharm. Ztg.*, 1889, 515.

Animal and Vegetable Fats.—The investigations of R. Benedikt and K. Hazura establish the facts that the vegetable fats always contain linoleic acid while the animal fats contain no fluid fatty acid other than oleic acid. For the physiologist these findings are interesting if not important. A practical value is also indicated, namely, the identification of commercial oleic acids as derived from vegetable or animal sources. This is possible by isolating the products of oxidation with alkaline permanganate of potassium, linoleic acid giving rise to sativic acid, hence, if this latter acid is found the former acid is indicated and with it the vegetable origin. For the preparation of a *pure* oleic acid only animal fats as suet or lard can be used.—(*Monatsh. der Chemie*), *Chem. Rpt.*, 1889, 216.

BALSAMODENDRON BERRYI.

BY DAVID HOOPER.

Buchanan's interesting "Journey through Mysore, Canara and Malabar" mentions (p. 8, vol. ii.) a species of myrrh about which little is known. "Many of the hedges here and in other parts of Coimbatore, are made of a thorn called *Mulukilivary*. It seems from its habits to be a *Rhus;* but not having found the fructification, I am very uncertain concerning its place in the botanical system. It makes a very good fence; cuttings three or four cubits long are put into the ground between March 12 and April 10. The ends are buried in the earth about a span, and very soon shoot out roots. From the moment it is planted it forms a fence against cattle; but seems to require a better soil than either *Euphorbium Tirucalli* or *E. Antiquorum*, which are the most common hedges here, and will grow anywhere."

The Mulukilivary in the above extract is the *Balsamodendron Berryi*, Arnot, and Coimbatore, the habitat of the plant, is a district lying to the south of the Nilgiri Hills. Hearing that a gum resin similar to the official myrrh could be obtained from this shrub, inquiry was made for samples and for information respecting it. The District Forest Officer of North Coimbatore forwarded me a sample of the gum-resin in October last, and furnished the following information: The gum-resin is used here by the natives medicinally. It is not collected for commercial purposes. It may be more abundantly procurable between the months of February and July. The cost of collection would come to Rs. 4 per maund (of 25 lbs.). The District Forest Officer of South Coimbatore sent me a sample rather inferior to the first, pointing out that the exudation was not used by the natives in the district in medicine or the arts, nor was it collected for commercial purposes.

The gum-resin was in pale yellow, yellowish-brown, or brown translucent fragments, tough, and breaking with a shining conchoidal fracture. The surface had an oily appearance, and when scratched or rubbed with some hard implement showed milk-white markings. Pieces of reddish-brown bark were attached to some fragments, and others were adhering to cloth in which it had been collected. Powder was of a dirty white color, and when rubbed up with water made a thin emulsion. The odor was oily, not fragrant. Colonel Beddome alludes, however, to an aroma given off by the plant. The taste was simply mucilaginous. It dissolves for the most part in water, leaving a few flocks of soft resin and impurities undissolved.

A selected sample of the gum-resin gave to water 84 per cent. of gum; it contained 5 per cent. of moisture and 6·6 per cent. of mineral matter. The gum was gelatinized by ferric chloride, and like that from true myrrh, was not precipitated by neutral plumbic acetate. The resin was soft, transparent, tasteless, odorless and neutral in reaction. It was soluble in alcohol, ether, bisulphide of carbon and chloroform. The solution in alcohol was not colored by ferric chloride, and gave a right-handed rotation when examined with polarized light. The resin moistened with alcohol gave no color with concentrated nitric or hydrochloric acid, and no violet liquid was obtained when bromine was added to its solution in carbon bisulphide. The resin separated by alcohol and evaporated was exposed to the heat of a water bath for a week and remained soft and tenacious; after this it was exposed to the air for about two months, but its consistence was not altered, and when examined under the microscope it was seen to be perfectly amorphous.

The myrrh from the *Mulukilivary* is evidently distinct from the true myrrh, Arabian myrrh and *Bissa Bol.* Its freedom from bitterness and fragrance would render it unfit as a substitute for the genuine drug and useless as a medicinal agent. It gives off no odor when burnt, and is therefore unsuitable as an ingredient in incense. It forms a good adhesive mucilage, and might be used as a convenient addition to some kinds of confectionery. An allied species of myrrh yielding a similar exudation is the *Balsamodendron pubescens,* growing in Beluchistan, and remarkable for the large proportion of gum in the gum resin.—*Pharm. Jour. and Trans., Aug.* 24, 1889, p. 143.

Antipyrin has been successfully used as an antigalactic by Dr. Salemi (*Bull. gén. de Thérap*). Using 0·5 gm. three times a day, the manmary secretion was diminished on the first day and ceased on the third day.

THE CULTIVATION OF MEDICINAL PLANTS IN CAMBRIDGESHIRE.

By E. M. Holmes, F.L.S., Curator of the Museum of the Pharmaceutical Society of Great Britain.

Having been informed that a portion of the aconite leaves used in commerce is grown in Cambridgeshire, and being desirous of determining how far the plants grown in the same district, as well as in different counties, vary in character, I obtained permission from Mr. W. Moore, of Foxton, who is apparently the largest grower of this plant in Cambridgeshire, to examine the plant grown by him, when in blossom. On arriving at Foxton, I found that besides aconite, belladonna and henbane are also grown by Mr. Moore; only seven acres out of a large farm being devoted to these three medicinal plants, the usual proportion being about three acres each of henbane and belladonna, to one of aconite. A little foxglove is also grown. The cultivation has now been carried on at Foxton for about thirty years. The soil is apparently a mixture of chalk and gravel, with a little clay.

Aconite.—This is planted in rows about two feet apart, and about one foot between each plant. The fresh plantations are generally made in March soon after the leaves appear, when the young plants are divided and planted out. Mr. Moore assures me that young plants are formed on the rootlets, as represented in Bentley and Trimen's illustration, and also at the bases of such stems as lay on the ground. This prolific formation of new roots may possibly arise from the fact that the aconite is usually cut down in the middle of June, when the flowers have begun to open, and the store of nourishment that would have gone to form seeds is probably diverted to forming roots. There does not appear to be any regular demand for aconite root of English growth, and to meet such demand as exists, a few roots are dug up in autumn, generally in October, and dried.

At the time I visited Foxton the plants were in perfection, about half of the flowers being expanded. The leaves were of a full dark green, and the flowers of a deep blue color. The helmet was not quite so semicircular as in the typical *Aconitum Napellus*, and the inflorescence showed a general tendency to branching. The whole of the plants, however, manifested a remarkable uniformity, were of very robust growth, and were flowering at the proper date, and the leaves possessed the characteristic taste of aconite. This uniformity is due to the fact that Mr. Moore never sows the seed, but always divides the root. Indeed, the plant is cut for making extract while still in flower, and therefore before the seed is formed. Mr. Moore does not, however, make the extract himself, but sends the fresh plant, packed like faggots, to London. The aconite is usually cut overnight and sent off by an early morning train, so as to prevent as far as possible any withering by exposure to the hot sun.

Although the plant is slightly divergent from the typical *A. Napellus,* is possesses the great advantage of uniformity, and the root obtained from it would be therefore far more dependable than the foreign root either for use in medicine or for chemical analysis.

Henbane.—This is sown in March or in the beginning of April, and is cut about the middle of June in the next year. For drying only the flowering tops are collected, not the stem leaves, and are rapidly dried in hot air in a kiln, in which about 2 to 4 cwt. can be dried in two days. The soil does not appear so well suited for henbane as the deep rich fen land of Lincolnshire, and the plant is frequently attacked in dry seasons with a fungus which causes wrinkling and discolored spots on the leaves. Here, as elsewhere, henbane is a very uncertain crop, three out of five seasons usually failing to afford a profitable return. The plant, beside being attacked by the fungus, has its leaves riddled with a little beetle resembling the turnip flea, and in the autumn a voracious grub, apparently that of *Mamestra brassicæ,* eats out the central leaf bud of the plant, so that they do not come up the second year. In the autumn the large root leaves are sometimes collected and dried, and are sold under the name of "First cutting of biennial plant," at a lower price than the flowering tops of the second year.

The variety cultivated at Foxton was obtained from wild plants found near Foxton, and has the broad leaf so characteristic of the wild henbane, as distinguished from the narrow thistle-like form cultivated in some counties. No use is made of the henbane roots, although it is hardly conceivable that they should not contain a sufficient amount of alkaloid to pay for extraction.

Belladonna.—This is grown from seed which is drilled in during the spring. The ground suits the plant admirably, being chalky, and although level is sufficiently porous to ensure the requisite drainage. It is, however, exposed to the full force of east winds, and hence the frosts, if late, are apt to injure it in spring, when it is about 1 ft. or

$1\frac{1}{2}$ ft. high. Later on it is in some seasons much attacked by green fly, which causes the leaves to pucker and wither. This generally takes place in the beginning of June.

The plant is usually sold in the green state for extract making, and the leaves are not dried. The plant is cut about the end of June. The second and third year afford the best crop of leaves, and the fourth year the roots are dug up and dried and the seed is sown in another locality. The first year after sowing, the leaves are not fit to cut, so that practically there are only three years during which the plants yield a crop.

Foxglove.—This is only cultivated on a small scale, as the wild plant is largely collected elsewhere for the purpose. The leaves are generally gathered in June from the biennial growth before the flowers have expanded.

In conclusion, I wish to take this opportunity of expressing my thanks to Mr. Moore for the liberal manner in which he has afforded information concerning the details of cultivation, etc., of the above-mentioned plants.—*Phar. Jour. and Trans.*, Aug. 17, p. 122.

MANUFACTURE OF PEEL ESSENCES.

Italy has always been the home of the orange and those of its congeners from which we derive the essences, such as lemon, bergamot and cedron, which are of so great importance in the perfumery and beverage industries. It might have been expected that the Paris Exhibition would have contained a more representative as well as a greater number of exhibits in this class than it does. But although we were somewhat disappointed on this score, we were at least pleased to note one or two exhibits of a very superior character in the Italian Court, and we were fortunate in meeting an attendant at one of them who displayed a remarkable amount of enthusiasm regarding his native industry, and who was commendably liberal in meeting our request for some information regarding his methods of working. This gentleman was Mr. C. Rizzuto, of Reggio-de-Calabre, an Italian town of 37,000 inhabitants situated opposite Messina. Mr. Rizzuto is senior partner in the firm of C. Rizzuto et Fils, whose manufactures, in conjunction with those of Francoia Genoese Labocetta, a relation, are exhibited by Pierro Merlino et Fils Cadet, of 67 Rue d'Hauteville, Paris, in the Italian Court of the Exhibition.

Mr. Rizzuto is a typical specimen of the robust Italian, grizzled by the hardships of the Garibaldian campaigns and the wars under Victor Emmanuel which gave Italy her freedom. A tough old soldier he is, bearing still the scars of wounds received when serving his country. But it is of his manufactures rather than his personality that we have to report. He tells us that the finest products are made by the old-fashioned sponge method, such as Mr. F. W. Warrick briefly described in a paper which we published last year. This method is very simple, and is used for the production of the finest essences. There are, we may state, nine different varieties or odors, lemon and bergamot being the chief. The trade names under which these varieties go are: "Bergamote," "Bergamote dorée (mûre)," "Bergamote extrait à la main," "Citron (limone)," "Citron vert (cru)," "Portugal," "Portugal muscade," "Bigarade," "Mandarine," "Limette," "Cédrin (cédrino)," and "Cédrat (cédrone)." By "à la main" is meant the sponge process, which consists simply of taking the whole fruit, dividing it into four parts, and pressing the external part of the peel against a sponge, which sucks up the essence as it is ejected from the oil sacs. Although this is a very primitive process the essences which are obtained by it are far and away the best, but the loss of essence is so great and the process so tedious that it is only applicable for those products which fetch a good price. Still, Mr. Rizzuto told us several famous perfumers will only use lemon, bergamot, etc., prepared in this way; and King Humbert, who has a liking for a single drop of "Cédrino" in his coffee, gets the à la main essence, costing 110 francs per kilo. in first hands. This flavor is also much used for ices.

For ordinary commercial purposes the essences are pressed out of the peel by means of a machine, which is entirely constructed of wood, saving the handle which turns the wheel. Contact with metal seriously affects the quality of the essence. The machine stands about 4 feet in height, and its structure is simple. The whole fruits are placed under the central circular portion, where the lower and upper surfaces are corrugated so as to press the peel unequally in order to break the oil sacs. The expressed essence is collected in a vessel below, and after settling for some time it is filtered through felt bags. Essences prepared by this method are what are known in commerce as the finest, those made by the sponge process being scarcely regarded as "commercial," their high price necessarily confining their use to those who specially order them. But it is, of course, possible to have different qualities of the machine-made essences, as quality greatly depends upon the condition of the fruit.

There is still some doubt existing regarding the characters which true essence of bergamot ought to present. Some say it should be brownish-yellow, pale yellow (as lemon is), or green. It is the last color that druggists are most familiar with, and addressing Mr. Rizzuto on this point, we asked him what he thought about it. His reply was given in Calabrian French, and its expressiveness is lost in putting it down in cool English, but it had in it a wholesome repugnance towards much of the green essence which is in the market. Bergamot fruit, he told us, ripens in January, and at that stage the essence which it yields is golden in color, and of very fine bouquet, but much weaker, or, as Mr. Rizzuto put it, not so strong in odor as the essence made from the green fruit in November. That essence is of course green, as it is pressed from the fruit and retains the color after filtration. At this point we inspected specimens of both kinds, amongst them essences made in the 1884 and 1885 seasons, which are still fresh, odorous, and perfectly free from terebinthinate taint. Mr. Rizzuto explained that the keeping properties are entirely due to the fruit being carefully selected and equally carefully expressed. "What becomes of the spoilt fruit?" was the question which naturally followed this explanation. "It is used for making the ordinary green essence. It is done in this way." And here Mr. Rizzuto submitted a photograph of the apparatus, which consists of three parts: (1) a boiler, (2) a still, and (3) a condenser. The bergamot peel is placed in the still, which is provided with a false bottom. The boiler is for the production of steam, which is passed into the still, from the bottom of which it rises, carrying with it the essential oil, and this is duly condensed and separated from the aqueous portion. The essence so obtained is of inferior odor and is water-white. Before it can possibly be placed on the market as green bergamot it must be skillfully "doctored," both to bring up the color and the odor. Copper is the colorant. It is remarkable how easily the peel essences take up copper. Lemon becomes quite green in a day if a few chips of bright copper are immersed in it, and all the others take up the metal equally readily. Body is given to the distilled essences by adding artificial perfumes, such as the paraffin ethers, to them; and it is at this stage that sophistication sometimes takes place.

It may be useful to state here what Mr. Rizzuto considers to be the common adulterant of bergamot. First, there is the adulteration of the true expressed essence with the distilled oil. It is practically impossible to detect this admixture, as the distilled oil only reveals itself in the course of time by its terebinthinate odor. The second class of adulterants comprises rectified petroleum, turpentine, and olive oil, and which are easily detected by shaking one volume of the essence with four volumes of alcohol (S. V. R. 6, water 1), and after an hour the adulterant, if any is present, sinks to the bottom. This method is not applicable, however, to lemon and the other essences, the purity of which may be judged roughly by mixing a few drops with a morsel of sugar, and judging the odor and taste in comparison with a standard sample. One of the most lamentable features of this industry is that adulteration is not only openly practiced, but is considered to be indispensable. At first sight the reason for this does not seem to be clear, but when we keep in mind the very large number of people engaged in it, and the consequent competition, it is not so surprising. The truth is, indeed, that manufacturers have to "meet" the market. Mr. Rizzuto was careful to explain to us that his connection with the distilled oils goes only so far as their sale in the state that they are produced in by distillation. Yet the demand for "fabricated" essences he believes to be enormous. This is directly traceable to consumers, especially aërated-water makers who sell lemonade at 10*d.* or 1*s.* per dozen. Cheap essence of lemon appears to be necessary for that; yet it would be better to pay 10*s.* or 12*s.* per lb. for a pure lemon than 4*s.* or 5*s.* for an article heavily loaded with turpentine or petroleum. A little of the pure essence gives a good flavor, whereas more of a sophisticated essence destroys the lemon and imparts a foreign flavor. And what is true of beverages ought to be doubly so, if that were possible, in regard to perfumes, for after all the nose is the best analyst, the most delicate sense which we have, and anything indefinite or foreign in the components of a perfume is apt to throw the whole compound out of gear, and to destroy what might otherwise be a delicious and refreshing odor.—*The Chemist and Druggist,* Aug. 24, p. 269.

Uses of antifebrin.—Salhi (*Corresp. f. Schweiz. Aerzte*) found antifebrin to act as a useful palliative in cases of sore throat and diphtheria; also in angina accompanied by high fever, the dose being 0·25 gm. three times daily.

A NEW DETERMINATION OF THE SPECIFIC GRAVITIES OF SOLUTIONS OF AMMONIA.

By G. Lunge and T. Wiernik.[1]

Grüneberg (*Jour. Soc. Chem. Ind.*, 1889,390) lately published a new table of the specific gravities of solutions of ammonia which table appears to agree very closely with that published years ago by Wachsmuth. The tables of both investigators are, however, based on determinations performed at different temperatures, and if the necessary connections are introduced into Wachsmuth's tables, who took 12°C. as the normal temperature, it will be found that the agreement with Grüneberg, although still good is no longer very close. Lunge and Wiernik now made a large number of experiments, in which the specific gravities and actual percentages of ammonia in ammoniacal liquors were determined with the greatest possible care. From these determinations a table was calculated, which agrees very well with Wachsmuth's corrected for a temperature of 15°C, whereas Grüneberg's figures are a little too low, as will be seen by the comparison of the tables.

Specific Gravity.	Carius 14°C.	Grüneberg 15°C.	Smith 14°C.	Wachsmuth Corrected for 15°C.	Lunge and Wiernik 15°C.
0·880	....	35·50	....	35·42	35·60
0·885	35·65	33·50	....	33·64	33·67
0·890	33·35	31·40	....	31·86	31·73
0·895	31·10	29·50	30·4	30·08	30·03
0·900	29·00	27·70	....	28·34	28·33
0·905	27·10	26·00	....	26·64	26·64
0·910	25·20	24·40	24·4	25·02	24·99
0·915	23·40	22·85	....	23·40	23·35
0·920	21·65	21·30	....	21·80	21·75
0·925	20·00	19·80	20·3	20·26	20·18
0·930	18·40	18·35	....	18·74	18·64
0·935	16·90	16·90	....	17·20	17.12
0·940	15·45	15·45	15·6	15·69	15·63
0·945	14·05	14·00	....	14·22	14·17
0·950	12·65	12·60	12·7	12·80	12·74
0·955	11·25	11·20	....	11·35	11·32
0·960	9·90	9·80	9·8	9·98	9·91
0·965	8·55	8·40	....	8·62	8·59
0·970	7·25	7·05	7·2	7·27	7·31
0·975	6·00	5·75	....	5·97	6·05
0·980	4·75	4·50	4·6	4·71	4·80
0·985	3·55	3·30	....	3·48	3·55
0·990	2·35	2·15	2·3	2·26	2·31
0·995	1·08	1·05	....	1·17	1·14
1·000	0·00	0·00	....	0·00	0·00

---

[1] *Zeits. f. angew. Chem.*, 1889, 181-183. Reprint from *Jour. Soc. Chem. Industry.*

Carius' table, which for a long time enjoyed a high reputation for correctness, must now give way to those of his successors, who although working independently, arrived at very nearly the same results.

The authors publish a further table, which will be found very useful.

TABLE OF THE SPECIFIC GRAVITY OF SOLUTIONS OF AMMONIA AT 15°C.

Sp. Gr. at 15°C.	Per cent. NH3.	One Litre contains Grammes of NH3.	Correct'n of the Sp. Gr. for I 1°C.	Sp. Gr. at 15°C.	Per cent. NH3.	One Litre contains Grammes of NH3.	Correct'n of the Sp. Gr. for I 1°C.
1·000	0·00	0·0	0·00018	0·940	15·63	146·9	0·00039
0·998	0·45	4·5	18	0·938	16·22	152·1	40
0·996	0·91	9·1	19	0·936	16·82	157·4	41
0·994	1·37	13·6	19	0·934	17·42	162.7	41
0·992	1·84	18·2	20	0·932	18·03	168·1	42
0·990	2·31	22·9	20	0·930	18·64	173·4	42
0·988	2·80	27·7	21	0·928	19·25	178·6	43
0·986	3·30	32·5	21	0·926	19·87	184·2	44
0·984	3·80	37·4	22	0·924	20·40	189·3	45
0·982	4·30	42·2	22	0·922	21·12	194·7	46
0·980	4·80	47·0	23	0·920	21·75	200·1	47
0·978	5·30	51·8	23	0·918	22·39	205·6	48
0·976	5·80	56·6	24	0·916	23·03	210·9	49
0·974	6·30	61·4	24	0·914	23·68	216·3	50
0·972	6·80	66·1	25	0·912	24·33	221·9	51
0·970	7·31	70·9	25	0·910	24·99	227·4	52
0·968	7·82	75·7	26	0·908	25·65	232·9	53
0·966	8·33	80·5	26	0·906	26·31	238·3	54
0·964	8·84	85·2	27	0·904	26·98	243·9	55
0·962	9·35	89·9	28	0·902	27·65	249·4	56
0·960	9·91	95·1	29	0·900	28·33	255·0	57
0·958	10·47	100·3	30	0·898	29·01	260·5	58
0·956	11·03	105·4	31	0·896	29·69	266·0	59
0·954	11·60	110·7	32	0·894	30·37	271·5	60
0·952	12·17	115·9	33	0·892	31·05	277·0	60
0·950	12·74	121·0	34	0·890	31·75	282·6	61
0·948	13·31	126·2	35	0·888	32·50	288·6	62
0·946	13·88	131·3	36	0·886	33·25	294·6	63
0·944	14·46	136·5	37	0·884	34·10	301·4	64
0·942	15·04	141·7	38	0·882	34·95	308·3	65

Administration of Cod Liver Oil.—The *Lyon Médical* suggests to combine cod liver oil with an equal quantity of lime water, the mixture being flavored with vanilla, lemon or other aromatic. Thus prepared it is pleasant to take, and agrees well with a delicate stomach. Similar formulas, using magnesia or potassium carbonate, are published in AMER. JOUR. PHAR., 1856, p. 2.

SOLUBILITY OF GLASS IN WATER.[1]

By F. Mylius and F. Foerster.

The authors have very carefully examined the solubility in hot and cold water of a large variety of glasses of very varying composition. The glass experimented on was roughly powdered and then sifted by means of two sieves of 72 and 121 meshes respectively to the square centimeter. The portions passing through the coarser sieve, but retained by the finer, were tolerably equal in size of grain, and it was safe to assume that in equal volumes of the different glasses thus prepared the total surface was approximately equal. The minimum surfaces for the quantities taken (18 to 20 grams) was 763 square centimeters.

The results show that glass *as such* is not soluble, the solution always being accompanied by decomposition, and the ratio of the various constituents in solution is quite different to that in the original glass. The action is essentially a chemical one. For instance, in an experiment where 2·5 grams of so-called soda water-glass was treated with water and the solution separated into fractions, the result was: Original glass, $Na_2O : SiO_2 = 34{\cdot}07 : 65{\cdot}93$: Fraction I, 88·13 : 11·87; fraction II, 41·64 : 58·33; fraction III, 30·31 : 69 69; fraction IV, 3·1 : 96·7. Fraction I was obtained by the treatment of the powdered glass with cold water for five minutes; II, by washing with hot water; III, by 15 minutes' boiling; IV was the insoluble residue left.

The principal conclusions deducible from the experiments are:—

(i.) Water-glass is decomposed by water into free alkali and silicic acid, a certain proportion (varying with the time of action, concentration and temperature) of the latter becoming hydrated and dissolved.

(ii.) Potash-glasses are far less soluble than soda-glasses, but the difference decreases with increase of the proportion of lime present.

(iii.) Soda and potash are united in glass both to the silica and the lime. The resistance of glass towards the action of water is dependent on the presence of double silicates of soda or potash and lime.

(iv.) Of all sorts of glass, the plumbiferous flint-glasses are least soluble in boiling water.

(v.) The relative resistance of glasses is different towards hot and cold water.

---

[1] *Berichte*, xxii, 1092–1112; reprinted from *Jour. Chem. Soc.*, Sept., 1889, p. 828.

Tables are given in the original showing the solubility as determined by digestion with boiling water for five hours, of various glasses commonly found in commerce, and the chemical composition of the same glasses.

MERCURAMMONIUM CHLORIDES.[1]

By G. André.

The solutions employed contained 33·875 grams of mercuric chloride and 4.25 grams of ammonia respectively per litre, and the compounds were obtained by precipitation in the cold.

When equal volumes of the two solutions are mixed, and the precipitate is collected after several hours or days, washed with a small quantity of water, and dried at 110°, it has not exactly the composition of mercurammonium chloride, NH_2HgCl. This result is due to the decomposing action of the water, which at once becomes evident in dilute solutions, and which, as Kane has shown, results ultimately in the formation of Millon's dimercurammonium chloride, $NH_2 \cdot Hg \cdot O \cdot HgCl$. If, however, mercuric chloride is added to an excess of ammonia and the precipitate is washed rapidly with a small quantity of water, the compound NH_2HgCl is obtained in a pure condition. The presence of Millon's compound in the precipitates formed in dilute solutions is readily detected by the fact that after these precipitates have been dried at 110°, they evolve water, if heated at a higher temperature.

With solutions of the strengths given above, the precipitate after one hour contained 0·11 mol., after 12 days 0.25 mol. of Millon's compound for each molecule of mercurammonium chloride. With 6 mols. of ammonia to each molecule of mercuric chloride, decomposition proceeds further, and the precipitate contains the two compounds in equal molecular proportions. With an increasing amount of ammonia, the precipitate eventually consists solely of the compound $NH_2 \cdot Hg \cdot O \cdot HgCl$. Variations in the proportion of mercuric chloride have no influence on the composition of the precipitate.

If the two solutions are mixed in equal proportions, allowed to remain 24 hours, the liquid decanted off, the precipitate treated with

---

[1] *Compt. rend.*, cviii, 233, 290, 1108 and 1164; reprinted from *Jour. Chem. Soc.*, June, 1889, p. 570, and Sept., p. 827.

8 vols. of the ammonia solution, and this treatment repeated after a second 24 hours, the final product consists entirely of Millon's compound, whereas the original precipitate contained only 25 per cent. of it. If the solutions are mixed in equal proportions, allowed to remain 24 hours, the liquid decanted off, 4 vols. of water added to the precipitate, and this treatment repeated twice at intervals of 48 hours, the product has the composition $NH_2HgCl,3NH_2{\cdot}Hg{\cdot}O{\cdot}HgCl$. Direct experiments with equal volumes of the solutions, and using equal volumes of water for washing, showed that the decomposing action of the water diminishes as the concentration of the ammonia increases. Ammonium chloride acts in exactly the opposite way to water. The addition of 1 vol. of the mercuric chloride solution to 5 vols. of the ammonia solution gives a precipitate which consists almost entirely of Millon's compound; but if after 24 hours the liquid is decanted off and the precipitate is treated with 2 vols. of a solution of ammonium chloride of similar strength, and allowed to remain for two days with occasional agitation the precipitate is completely converted into the compound NH_2HgCl. The proportion of ammonium chloride required to produce this result is smaller the smaller the quantity of dilute ammonia used in the precipitation. The addition of ammonium chloride without previously decanting the liquid from the precipitate has very little effect upon the latter.

If potassium hydroxide is present, so that some mercuric oxide is formed, the product contains dimercurammonium chloride, NHg_2Cl. The solutions employed contained, as a rule, one-eighth of a gram-molecule per liter. When mercuric chloride is mixed with an equal volume of potash solution and then with the same volume of ammonium clhoride solution, and the precipitate, which becomes quite white, is washed and dried at 100°, it has the composition $NHg_2Cl,2NH_2HgCl,$-$NH_2Hg{\cdot}O{\cdot}HgCl$. If the mercuric chloride and ammonium chloride are first mixed and the potash added afterwards, the precipitate remains yellowish, and whether filtered off after a few minutes or after several hours, has the composition $NHg_2Cl,NH_2HgCl,NH_2Hg{\cdot}O{\cdot}HgCl$. The smaller the excess of ammonium chloride the greater the proportion of NHg_2Cl. If equal volumes of mercuric chloride and potash solution are mixed and heated to boiling for some minutes, then mixed with an equal volume of ammonium chloride and again boiled for a short time, the precipitate has the composition $NHg_2Cl,NH_2Hg{\cdot}O{\cdot}HgCl$, a result due to the conversion of mercurammonium chloride,

NH_2HgCl, into the compound $NH_2Hg \cdot O \cdot HgCl$ when heated with water.

Employing solutions of the same strength as in previous cases, 200 cc. of mercuric chloride solution was mixed with 150 cc. of potassium hydroxide solution and then with 100 cc. of ammonia solution, agitated for an hour and a half, filtered, washed, and dried at 100°. The precipitate has the composition

$$NHg_2Cl + NH_2Hg \cdot O \cdot HgCl,$$

is not affected by boiling water, and does not alter even if heated in a current of air at 140° for two hours.

300 cc. of potash solution was mixed with 600 cc. of ammonia and 600 cc. of mercuric chloride was added. The precipitate was at first yellow, but soon became white. Analysis of the filtrate and the precipitate showed that the latter had the composition $NHg_2Cl + 2NH_2HgCl + NH_2Hg \cdot O \cdot HgCl$. If only ammonia is in excess, so that no ammonium chloride is found in the filtrate, the proportion of mercury in the precipitate becomes less, the mercurammonium chloride, NH_2HgCl, being completely decomposed. The same result is obtained whether the mercuric chloride is added to the mixture of potash and ammonia or potash is added to a mixture of the other two.

200 cc. of mercuric chloride was mixed with 400 cc. of ammonia and the precipitate washed by decantation and mixed with one molecular proportion of potassium hydroxide. After agitation for one and a half hours, the precipitate was washed and dried at 110°. Analysis of the filtrate and the precipitate shows that mercurammonium chloride is decomposed by potassium hydroxide, whilst at the same time it is decomposed by water with formation of Millon's salt and ammonium chloride, the composition of the precipitate being $NHg_2Cl + 2NH_2Hg \cdot O \cdot HgCl$.

In all these reactions, when ammonium chloride is formed mercurammonium chloride is also produced, but if ammonium chloride is not formed the precipitates contain only the compounds NHg_2Cl and $NH_2Hg \cdot O \cdot HgCl$. The dimercurammonium chloride is converted by excess of ammonium chloride into mercurammonium chloride.

Valerianic ether has been used as a stimulant, more particularly for anæmic women subject to fainting fits. It is administered in pearls.

Pomade for chapped hands.—Lanolin, 100 gm.; paraffin oil, 10 gm.; vanillin, 0·1 gm.; oil of rose, 1 drop. Apply morning and evening. *Rev. Thér. Méd.*

MANGANESE OXIDES AND MANGANOUS CARBONATE.[1]

By A. Gorgeu.

When manganous hydroxide is exposed to air in presence of an excess of a manganous salt, it yields the manganese manganite, $2MnO,MnO_2$, with a variable quantity of water. In presence of oxygen instead of air, oxidation is more rapid and the proportion of oxygen in the product is slightly higher. The product slowly absorbs oxygen from the air or from oxygen at the ordinary temperature, but even after 12 years the proportion of oxygen does not exceed that required by the formula MnO_2,MnO. In presence of alkalis or alkaline earths, as is well known, manganous hydroxide will take up a much larger proportion of oxygen.

Solutions of manganous salts gradually become turbid when exposed to air, especially in diffused light, and still more rapidly in bright sunlight. The change does not take place in an atmosphere of hydrogen. With the chloride, sulphate and acetate, the precipitate has the composition MnO,MnO_2, but with the nitrate, its composition is $2MnO,3MnO_2$. The quantity of manganese precipitated in this form is only a small fraction of that present in the liquid. In concentrated solutions the amount precipitated is still less, and hence it would seem that precipitation is due to the action of oxygen on a manganese salt partially dissociated by water.

Solutions of manganous sulphate, nitrate, chloride, bromide and iodide may be boiled without undergoing any noteworthy alteration, but the acetate yields more precipitate than at the ordinary temperature. The precipitate has the composition MnO,MnO_2, the acetic acid is continuously given off during boiling, hence it would seem that manganous oxide is liberated in consequence of the dissociation of the salt, and behaves like the manganous hydrate thrown down by alkalis.

Iodine dissolved in a solution of potassium iodide has little action on manganous hydroxide, scarcely attacks manganous carbonate, and has no action on the acetate and salts of the strong acids. Chlorine acts rapidly on the hydroxides and on all the salts. The most concordant results were obtained with chlorine-water and manganous carbonate. With the carbonate in excess, the product was MnO,MnO_2, but with chlorine in excess the more highly oxidized products, $MnO,4MnO_2$ and $MnO,5MnO_2$, were obtained. Up to the latter point the mixture remained neutral, and the manganous chloride formed was equivalent to the oxygen which entered into combination. The further action of chlorine is indirect, hydrochloric acid and not manganous chloride being formed.

---

[1] *Compt. rend.*, cviii, p. 948 and 1006; reprinted from *Jour. Chem. Soc.*, Sept., 1889, p. 829.

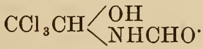
Bromine behaves in a similar manner, but the reaction is slower.

Native manganous carbonate or *diallogite* is very stable and remains unaltered after contact with aerated water for 3 years. Precipitated manganous carbonate which has become crystalline remains in contact with aerated water at the ordinary temperature without forming any peroxide. Even at 100° the amount of peroxide formed is very minute. If the precipitated carbonate remains in contact with aerated water for 10 years, about one-third is decomposed, and the product has the composition MnO,MnO_2. Two specimens containing respectively 80 and 70 per cent. of manganous carbonate were exposed to the air in the dry state for 8 years; in the first case 33 per cent. and in the second 14 per cent. of manganous carbonate remained, the rest having been converted into the oxide MnO,MnO_2.

The oxide MnO,MnO_2 can be obtained by the direct combination of manganous hydroxide and hydrated peroxide, and undergoes no change if exposed to air for 5 months in the dry state or under water.

Manganous carbonate, when exposed to the air at the ordinary temperature, yields no oxide higher than MnO,MnO_2; but when manganous carbonate is exposed to air at 100° for 250 hours only two-thirds remains unaltered, the rest being converted into an oxide which contains considerably more oxygen than is required by the formula MnO,MnO_2. At 200°, after 30 hours, the oxide formed contains 92 per cent. of manganese peroxide. The oxide MnO,MnO_2 undergoes no further oxidation at 100°.

Chloralamid, a new hypnotic, was introduced by v. Mehring. It is a product of chloral anhydride (CCl_3CHO) and formamid ($CHONH_2$) and has the formula



$CCl_3CH\langle\begin{smallmatrix}OH\\NHCHO\end{smallmatrix}$. It is *chloral-formamid,* and forms colorless crystals, soluble in nine parts of water and in one and a half parts of alcohol. Its taste is mild, slightly bitter, but not biting. The watery solution keeps well; but when heated or in the presence of alkali, chloral hydrate and ammonium formate are produced. It has been given in doses of 2 to 3 grams (30 to 45 grains); sleep is usually produced in one-half to three-quarters of an hour. No unpleasant after-symptoms and no circulatory disturbances have been observed.

ACTION OF ACIDS ON THIOSULPHATES.[1]

BY BERTHELOT.

Thiosulphates, as is well known, are decomposed by acids with liberation of sulphurous anhydride and precipitation of sulphur. The sulphur, however, exists in different allotropic modifications, the sulphurous anhydride reacts with the liberated thiosulphuric acid before it has time to decompose, and forms thionic acids, and the latter are partially dissociated by the water. It follows that the final state of the system is a condition of equilibrium between many reactions. When a solution of sodium thiosulphate is mixed with boric acid there is no sensible thermal disturbance, and the liquid remains colorless and transparent. Acetic acid likewise produces no sensible variation of temperature, but a precipitate gradually forms and increases in quantity. The quantity of iodine absorbed is also much less than would be required if all the thiosulphurous acid were decomposed into sulphurous acid and sulphur. The thiosulphate is only decomposed to a slight extent, and it follows that the heat of neutralization of thiosulphuric acid is greater than that of acetic acid, +13·3 Cal. It is possible that an acid sodium acetate is formed, and the sulphurous anhydride which is liberated produces thionic acids by interaction with the thiosulphuric acid, and hence the great length of time required before equilibrium is established.

With sodium thiosulphate and very dilute sulphuric acid there is an immediate slight rise of temperature, followed very rapidly by the formation of a precipitate and a slight fall of temperature. The heat of neutralization of thiosulphuric acid is therefore lower than that of sulphuric acid.

Hydrochloric acid of certain concentrations produces a slight development of heat, whilst with other concentrations there is a slight absorption of heat. The liquid becomes turbid almost immediately, owing to precipitation of sulphur. It is evident that the reaction is somewhat complicated, but it is also evident that the heat of neutralization of thiosulphuric acid is practically the same as that of hydrochloric acid, and it may be taken as +13·8 Cal. without sensible error. The absorption of heat observed in some cases is due to the decomposition of the thiosulphuric acid, and is exactly equal to the difference between the heats of formation of thiosulphuric and sulphurous acids respectively. The quantity of iodine absorbed by the solution after various times and under various conditions is given in the form of a table. Neglecting the complications due to the action of sulphurous anhydride on thiosulphuric acid, it seems that the decomposition of the latter begins immediately, and increases with the time and with the proportion of hydrochloric acid.

---

[1] *Compt. rend.*, cviii, 971–978; reprinted from *Jour. Chem. Soc.*, Sept., 1889, p. 824.

The action of sulphurous acid on sodium thiosulphate in various proportions is always exothermic, although the development of heat is but slight, and it would seem that there is a division of the base between the two acids, and interaction between those portions of the acids which remain free. When the two liquids are mixed, they become yellow and sulphur is precipitated, especially if the thiosulphate is in excess. If, on the other hand, sulphurous acid is in excess, only traces of sulphur separate, and these gradually redissolve. The quantities of iodine absorbed by the liquid indicate that decomposition is not complete, but is limited by the formation of thionic acids. The latter reaction also remains incomplete in consequence of the dissociating action of the water, and it follows that when equilibrium is established, the liquid has a very complex constitution, and contains thiosulphuric acid, sulphurous acid, sulphur, and thionic acids, the base being divided between thiosulphuric and sulphurous acids.

EXAMINATION OF COMMERCIAL PEPTONES.[1]

By J. König and W. Kisch.

The methods hitherto in use for estimating the soluble and non-coagulable protëids (the albuminoses and peptones) are far from satisfactory. The precipitation of the albuminoses by ferric acetate, with subsequent precipitation of the peptones by sodium phosphotungstate, yields very discordant results. The authors adopt the method of Kühne and Chittenden (Am. Jour. Phar., 1886, p. 563), precipitation of the albuminoses with a saturated solution of ammonium sulphate, and in another portion the precipitation of both albuminose and peptone by sodium phosphotungstate, and estimation of the peptone from the difference. From 5 to 20 grams of substance (according to the proportion of water it contains) is taken. The insoluble matter and coagulable albumin are separated by filtration and by boiling, and their amount determined. This is preferably effected by Kjeldahl's nitrogen process. Multiplication of the nitrogen found by 6·25 gives the amount of albumin more correctly than direct weighing. The filtrate is made up to 500 cc.; of this 50 cc. or 100 cc. is evaporated to about 10 cc., and mixed with 100 cc. of a saturated solution of ammonium sulphate in the cold. The precipitate is filtered off, washed with ammonium sulphate solution, dried and weighed, and the ammonium sulphate adhering is ascertained by a sulphuric acid determination and deducted. Of the same filtrate 50 cc. or 100 cc. is acidified with sulphuric acid, and precipitated with a strongly acid solution of sodium phosphotungstate. The precipitate is washed with dilute sulphuric acid, and the nitrogen it contains is determined. Although albuminose and peptone contain less nitrogen than albumin, the same multiplier should be used, as this will to some extent compensate for the traces of other nitrogenous substances precipitated at the same time.

---

[1] *Zeit. anal. Chem.*, xxviii, 182–201; reprinted from *Jour. Chem. Soc.*, August, 1889, p. 803.

Salkowski (*Berlin. Klin. Wochensch.*, 1885, No. 2), gives the following differences between albumin-peptone, gelatin and gelatin-peptone (a 3½—5 per cent. solution being used).

	Albumin-peptone.	Gelatin.	Gelatin-peptone.
5 vols. of glacial acetic acid and 5 vols. of sulphuric acid mixed......................	violet	yellowish	yellowish
An equal volume of concentrated sulphuric acid in the cold.........................	dark-brown	yellow	yellow
Millon's Reagent................	reddish pp.	colorless	colorless
Solution boiled with $\frac{1}{5}$ vol. of nitric acid (1·2), then made alkaline with soda...........	deep orange	lemon-yellow	lemon-yellow

BRITISH PHARMACEUTICAL CONFERENCE.

During the second week of September the twenty-sixth annual meeting of the British Pharmaceutical Conference was held at Newcastle-upon-Tyne. For the following abstracts of the papers read on this occasion, we are indebted to the *Pharmaceutical Journal and Transactions, September* 14.

Tincture of Senna.—Mr. B. S. Proctor reiterated an opinion, expressed on previous occasions, that the official tincture of senna is an inert preparation of an active drug. In support of his position Mr. Proctor stated that alcohol is in this case an unsuitable menstruum and that, in fact, he had taken the rectified spirit extract from half an ounce of senna leaves without producing any effect; but that a draught made from the senna marc that had been already extracted with rectified spirit produced pretty strong catharsis with griping. In respect to proof spirit, Mr. Proctor said that he had taken an ounce of the official tincture of senna without any effect, and pleaded his temperance principles as a reason for not taking the quantity that would be required to produce results beyond those due to alcohol. In the discussion that followed Mr. Gerrard pointed out the desirability that the Pharmacopœia should include a greater variety in the strength of alcohol, a suggestion that was endorsed by other speakers.

On Papain and Pepsin.—Mr. A. Ball described the results obtained in some comparative experiments with commercial samples of papain and pepsin. From these it appeared that the papains examined by him were far inferior to the pepsins in digestive power and that in addition the peptone formed by papain was deficient in diffusive properties Mr. Ball criticized sharply the official test requiring that two grains of pepsin should be equal to the digestion of only one hundred grains of albumen, whereas he had found that "one grain of the best pepsins in the market will digest five hundred to fifteen hundred grains when subjected to the prescribed test," and he commended "some intelligent pharmacists" who, when pepsin is ordered, dispense the pepsin guaranteed pure and free from any admixture. In the discussion that followed the pertinent question was raised as to how much albumen the pepsins for which greater activity was claimed would digest when tested strictly under B. P. conditions. But this point Mr. Ball did not appear to appreciate ; at any rate the question remained unanswered.

The Solubility of Glass.—A paragraph that appeared in *The Month* (p. 163), relative to the coloration of some chloral hydrate by pigment derived from the bottle, gave Mr. Reynolds the opportunity for the next paper, in which he suggested that the question as to whether and how far glass bottles are soluble was one worthy of further investigation. As a contribution to the subject from personal experience, he mentioned that a solution of 1 in 10,000 of hydrochloric acid in water, which when freshly made gave a distinct reaction with congo paper, failed to do so after being kept a day in a flint glass bottle. This result he was inclined to refer to the chemical interference of the bottle with its contents. Other instances were mentioned in the discussion, and Dr. Thresh referred to an observation that a "rainfall" which when collected on litmus paper, he had found to be invariably acid, was either neutral or faintly alkaline when collected in a bottle.

Extract of Stramonium.—A practical note by Mr. A. W. Gerrard. It was the record of an observation, made in an emergency, that in the preparation of extract of stramonium the preliminary percolation of the seeds by ether might be omitted. He found that when the seeds were exhausted with hot proof spirit the resulting tincture yielded on evaporation a satisfactory extract containing very little fixed oil, which, if desired, could be removed by washing with a little ether.

Ferri et Ammonii Citras.—The next paper, by Mr. B. S. Proctor, had its origin in the observation of changes that took place in mixtures containing ferri et ammonii citras as a constituent. For instance, one mixture consisting of forty grains of the citrate to eight ounces of water gradually became turbid, depositing a brown precipitate, and the liquid eventually becoming colorless or nearly so. When the mixture was made up with hard instead of distilled water, part of the precipitate was buff-colored and part black. At first an explanation of the instability was looked for in Mr. Umney's opinion, expressed in *The Pharmaceutical Journal* in 1873, that the official compound was deficient in ammonium citrate, and indeed a slightly better result was obtained upon the addition of a little of that salt. But that this was not a full explanation, was shown by the fact that a sample that yielded 32 per cent. of ferric oxide on incineration was more stable than one that contained only 30·7 per cent. It was then observed that the residue from an incineration gave off the odor of sulphuretted hydrogen upon the addition of hydrochloric acid, and the presence of sulphate in the original citrate was confirmed by the barium test. A suggestion that a manufacturer's modification of the official process for citrate of iron and ammonium, in precipitating the ferric hydrate with caustic soda and the use of hard water, might have introduced a trace of sulphate, was negatived by the fact that a sample in the preparation of which the ferric hydrate was known to have been precipitated by ammonia, gave palpable quantities of sulphate and only traces of lime. Mr. Proctor himself refers the contamination, which in some cases equalled 2 per cent. of sulphuric anhydride, to the conditions under which the citrate is manufactured on the large scale. It is known that when ferric hydrate is precipitated from the sulphate it will contain a notable quantity of basic sulphate, unless the caustic alkali used in the precipitation is kept continually in free excess. But when a large stream of iron liquor is poured into alkali this condition is not present, since the liquid immediately surrounding the point of impact will always contain iron in excess of alkali for a sufficiently long time to allow of the formation of basic sulphate, which may escape decomposition even after the mixture becomes more complete. The remedy suggested is to allow the two solutions to mingle in thin streams so regulated that the correct equivalent proportions are pretty closely maintained. Mr. Proctor's paper also contained some interesting observations on the retardation of the precipitation of barium sulphate in the presence of a citrate.

Easton's Syrup.—Mr. Clague called attention to the fact that samples of Easton's syrup are sometimes met with which through the influence of a low temperature have undergone such change as to render them unfit for use. In one case the "syrup" was a jelly-like mass, with long needle-shaped crystals and tufts of crystals, and a smaller amount of fine white precipitate showing. Warmth brought about solution, but precipitation again took place on cooling to about 32° F. It was found, however, that the addition of 25 per cent. of water sufficed to maintain solution at the lower temperature, and that this was not affected upon the addition of the quinine, strychnine and ferrous phosphate requisite to bring it up to Easton's strength. The high specific gravity of the samples pointed to excess of sugar as the source of trouble, and it was ascertained that the precipitation and gelatinous appearance stood in direct relation to the quantity of sugar present. Mr. Clague therefore recommended that where Easton's syrup finds a ready use, the original formula, containing 35 per cent. of sugar, should be adhered to; but that where it is not in so frequent demand the formula of the "Extra Pharmacopœia' should be followed, reducing the quantity of sugar (37·5 per cent.) 10 per cent. Mr. Clague also expressed regret that there should have been introduced into the B. P. C. Unofficial Formulary a preparation bearing the same name as Easton gave to his syrup, though only containing three-fourths as much quinine phosphate. In commenting upon the paper, the President said he felt inclined to attribute the present relatively frequent occurrence of solidification in such syrups to cane sugar having been displaced in the market by beet sugar.

Nitrous Vitriol and Aerated Waters.—The note of Mr. Pattinson on the effect of using vitriol containing a nitrous contamination in the manufacture of certain aerated waters, although having a valuable practical application, contained nothing that had not been published before. It was to the effect that the author had traced an opalescence in a sample of ginger ale to the action of a nitrous impurity derived from the vitriol used for generating carbonic acid upon the ginger essence, the color of which it eventually discharged. The same subject was brought before the Pharmaceutical Society at an evening meeting in March, 1885 (*Pharm. Journ.*, [3], xv, 731), when Mr. Naylor recorded the much more important observation that the nitrous impurity is also capable of rapidly destroying the pungency of both ginger essence and capsaicin.

Standardized Ipecacuanha Preparations.—The standardization of the fluid extract and wine of ipecacuanha was the subject of the next paper read, which was the joint production of Mr. J. O. Braithwaite and Mr. J. C. Umney. For their experiments, the authors had used a root estimated to contain 1·32 per cent. of emetine, and the menstruum selected as giving the best results was rectified spirit. An extract was obtained, which estimated by a modification of Ransom's process yielded 1·28 per cent. of alkaloid. It is therefore proposed that a standard extract, prepared by a process consisting essentially of a first maceration and percolation with spirit, and then after addition of slaked lime to the mark, of a second maceration and percolation with spirit, should be so adjusted in strength that 100 fluid parts should contain 1·25 parts by weight of emetine. From this it is proposed to prepare a standardized wine by dissolving one fluid part of the extract in sufficient sherry wine to produce twenty fluid parts.

Ipecacuanha Wine.—Finding that the modified Ransom process of assay referred to in the previous paper could be applied directly to the wine, Messrs. Braithwaite and Umney made some experiments as to the effect of the conditions obtaining in the official process for ipecacuanha wine in the amount of alkaloid present in the finished preparation. From their results they conclude that the present official process extracts practically all the alkaloid from the root, but that a considerable proportion of it is afterwards lost in the drying and powdering of the acetic extract, so that the wine produced is far inferior in relative alkaloid strength to the root from which it is prepared. They further express the opinion that the wine of the present Pharmacopœia, although a more elegant preparation than that of the B. P., 1867, is considerably inferior to it in its chief therapeutic ingredient. Samples of the preparations referred to in this and the preceding paper were shown, and the authors were strongly complimented on their contribution towards the solution of a troublesome problem.

Assay of Ipecacuanha Wine.—In another contribution to the literature of ipecacuanha that followed, Mr. T. P. Blunt suggested a modification in the present method of assaying the wine for alkaloid by means of Mayer's solution. It consisted in adding a saturated solution of mercuric chloride in potassium chloride in excess to the wine previously evaporated to remove the alcohol, and then after filtering, taking the quantity of a centinormal solution of mercuric chloride that can be added to the filtrate before a permanent precipitate is produced as the measure of the quantity of mercuric chloride that has been removed from the originally saturated solution by combination with the alkaloid.

Strychnine and Morphine Hypophosphites.—Mr. H. W. Jones called attention to the possible value of hypophosphorous acid as a solvent of strychnine and morphine. But these alkaloids dissolve readily, according to the author, in dilute hypophosphorous acid to form solutions which can be obtained neutral, or only very faintly acid, by using a slight excess of the alkaloid. The hypophosphite of strychnine was described as a very stable salt in solution, suitable not only for hypodermic injection, but as a substitute for the hydrochlorate in the official liquor strychninæ which sometimes causes trouble in cold weather. The ready solubility of morphine in the dilute acid allows of a solution of 1 in 6, or even stronger, being easily prepared

On a Methyl Chloride Apparatus.—The object of the next note, by Mr. Martindale, was to bring under the notice of the Conference a convenient little apparatus for holding chloride of methyl, which has been recently introduced into medical practice as a refrigerator. This apparatus consists of a "thermo-isolator" made of a glass test-tube fused at the top to a larger surrounding tube after the interspace has been first rendered vacuous. The vacuum acting as a non-conductor, the methyl chloride may be kept in the jacketed test-tube for some time without undergoing the volatilization which takes place almost immediately when the liquid is released from pressure under ordinary conditions. It is thus rendered acccessible for saturating tampons for direct application to any part of the body and for similar purposes, when it is not desired to apply the refrigerator as a spray.

On the Root Bark of Euonymus atropurpureus, by Messrs. W. A. H. Naylor and E. M. Chaplin. This paper represented the useful class of work which consists in repeating the experiments of previous observers. In this instance the authors regulated their proceedings by the experiments on euonymus root bark made by Mr. W. T. Wenzell, as recorded by him in a paper published in the AMERICAN JOURNAL OF PHARMACY in 1862. They report that they have separated from the bark an unidentified crystallizable glucosidal principle, to which they have given the name "atropurpurin," Wenzell's "euonymin," citric, tartaric and malic acids, neutral fixed oil, crystalline free fatty acid or acids, an acrid and pungent principle, yellow and brown resins, bitter extractive and wax. Their results differ from Wenzell's chiefly in that instead of asparagin they obtained atropurpurin, which contains no nitrogen; besides which they got bitter extract instead of a soft resin, free fatty acid in place of crystalline resin, brown resin soluble instead of insoluble in ether, and an acrid pungent principle that Wenzell failed to detect.

Misconceptions about Lithia.—Mr. Siebold referred to the great faith shown by some therapeutists in the superior solvent action of lithia upon uric acid, and pointed out that this faith extends not only to the carbonate and citrate, which are capable of acting as antacids, but also to mineral waters containing mere traces of lithium compounds and those in the form of chloride or sulphate. In a series of experiments made to ascertain how far this faith has a chemical foundation, he found that the solvent action of solutions of lithium, sodium and potassium carbonates on a given weight of uric acid, pure or as deposited from urine, or on a given weight of urinary sediment consisting of acid urates, under exactly similar conditions, is strictly proportional to the ratio of the molecular weights of these solvents. Further that lithium chloride and lithium sulphate have no solvent action on uric acid and acid urates, and lastly that the degree of alkalinity of urine produced by the internal administration of medicinal doses of lithium citrate is not greater than that produced by equivalent doses of potassium citrate.

Arsenic in Glycerin.—Consequent upon some statements that have been made recently, respecting the occurrence of arsenic in glycerin, Mr. Siebold's attention has been directed also to that subject, and he reported the results of the examination of a number of samples for the presence of such a contamination. The experiments were not extended to low qualities of glycerin, but were confined to colorless and odorless samples sold for toilet and pharmaceutical purposes. The majority of the samples tested proved to contain arsenious acid varying in proportion from 1 part in 4000 parts to 1 part in 6000. A few samples exceeded this proportion, and one contained as much as 1 part in 2500. Some samples that were found free from arsenic were traced all to one process of manufacture, which was described as being that by which as a rule glycerin used for dispensing purposes is understood to be made. The process followed in testing, which was demonstrated by Mr. Siebold, was a modification of one recently recommended by Vulpius and Flückiger, which depends upon the action of the gas given off by a mixture of the glycerin with zinc and very dilute hydrochloric acid in a test tube upon a paper cap that has been touched with a drop of a solution of mercuric chloride, a yellow spot being the result of the presence of minute traces of arsenic. A further observation by Mr. Siebold was consistent with arsenic being sometimes introduced into glycerin from the glass of the containing bottle, and it is proposed to further investigate this point; but there was a general agreement among the speakers that such quantities of arsenic as those found in some cases were more probably introduced during the manufacture.

Lead in Water.—The special object of the paper next read, by Mr. R. Reynolds, was to point out that the report of a chemical analyst on the presence or absence of lead in any particular sample of drinking water, should be so framed as to guard against it being taken to mean more than it stated. It was pointed out that the quantity of lead taken up by an acid water might vary considerably with the conditions, and that therefore the results of an analysis of a water that had been subjected to a minimum influence might have no relation to the results obtained with the same kind of water after it had been submitted to more energetic or prolonged action. This was illustrated by the results obtained in the examination of a sample of water drawn at 7 A. M., when it had probably lain in contact with the pipes for some hours, which gave 0·35 grain of lead per gallon, and one drawn three hours after, which gave only 0·1 grain per gallon. It was therefore suggested, among other ways, that relative certainty should be secured by the analyst directing that samples of water intended for analysis should be left in contact with the ordinary service pipe for twenty-four hours.

Strychnine Vermin Killers—Mr. A. H. Allen gave the results of the examination of a number of samples of vermin killer obtained from different sources. These appeared to show considerable variation in the absolute and relative quantities of strychnine they contained. The principal interest of the paper lay in a suggestion as to the use of pigments for the coloration of such powders, which in those examined were ultramarine, prussian blue and carmine. Mr. Allen is of opinion that a preferable substance would be found in chrome green, or green oxide of chromium, principally on the ground of its great stability. Further, he thought arsenical fly papers should be impregnated with some soluble coloring matter, which would color water in which they are placed, and for this purpose he suggested indigo carmine, or sulphonated indigo might be used.

On a Scale of Small Residues.—In washing precipitates or exhausting drugs by percolation it often becomes important to be able to estimate the amount of solid matter that the solvent is extracting. With a view to aiding the judgment Mr. Proctor has constructed a scale of standards for comparison consisting of the residues of the evaporation on glass slides of drops of liquid containing from one millionth to one thousandth of a grain of solid matter. The materials selected are calcium sulphate, potassium nitrate, gum acacia and gum tragacanth. The lower dilutions are made with water, but for the higher dilutions spirit is used in order to avoid vitiation of results by the fixed matter present even in distilled water.

On Strophanthus.—Mr. Thomas Christy gave the results of observations on various parcels of strophanthus seeds received by him since 1878, and of plants grown from some of them. So far as could be gathered his opinion coincides with that already expressed by Professor Fraser, that seeds received under the name "kombé," although differing in some minor respects from "hispidus" seeds, are like them referable to *Strophanthus hispidus*. The seeds of "*Strophanthus glabrus* of Gaboon" were stated to yield a "crystallizable alkaloid," but if this be correct it will be apparent from Professor Fraser's results that they differ in this respect from the seeds of *S. hispidus*. Another variety of seeds was referred to under the name *Strophanthus minor* (B), "very small in size, blunt at one end and having a spike at the other," thought to be suggestive of the appellation "turtle strophanthus," which appears to have contained little active principle. A number of specimens were shown to illustrate the great diversity in leaf presented by plants grown from seeds received in the same parcel.

On Strophanthus.—The next paper read may be looked upon as one of the most important—as it was certainly the most elaborate—brought under the notice of the Conference at the Newcastle meeting. It consisted of a *résumé* of recent work done by Dr. T. R. Fraser upon the chemistry of strophanthus seeds, and appeared to be a continuation or development of the paper read by him before the Royal Society of Edinburgh a few months since and reported in *The Pharmaceutical Journal* (Feb. 16, p. 660), in which he dealt principally with the botany of this new and important drug. In the present paper the results obtained by treatment of the triturated dried seeds with petroleum ether, ethylic ether, water and rectified spirit, are recorded, but for the purposes of this note detailed reference need only be made to the alcoholic extract, since it contained the whole of the active principle, strophanthin. An alcoholic extract obtained after removal of fat by ether amounted to 8·94 per cent. of the original weight of the seeds and it was estimated to consist of 63 367 per cent. of impure strophanthin, 16·275 per cent. of mucilage and 14·542 per cent. of resin. The extract was the product of three successive percolations, the first with 10 parts of rectified spirit and the other two with 5 parts each. It was found that the first percolation removed 7·9 per cent. of the 8·94 per cent. of extract obtained, and that it was very much richer in strophanthin than the products of the succeeding percolations, nearly all the active principle being extracted by the ten parts of spirit and in a more satisfactory state than in the latter portions of the extract. Further experiments showed that most of the coloring matter, resin and mucilage is derived from the testa and most of the strophanthin and oil from the cotyledons and embryos. Treatment of the dry extract as well as of an aqueous solution with reagents failed to indicate the presence of an alkaloid, but the reduction of Fehling's solution by solutions of the extract in dilute acids gave evidence of a glucoside. This action was satisfactorily connected with a substance that appeared in well-formed crystals during the evaporation of non-acidulated watery solutions of the extract, and which was identified as the active principle strophanthin. In fact it was found that strophanthin is readily decomposed by weak solutions of acids, yielding glucose and a body that has been named "strophanthidin," which crystallizes so readily that it is thought that its production in an extract by treatment with an acid might be taken as an indication of the amount of active principle originally contained therein. Strophanthin is difficult to separate; but it was obtained pure by a somewhat tedious process depending upon the formation of a tannic acid compound and subsequent decomposition by lead oxide, and it yielded upon analysis results corresponding with the formula $C_{16}H_{26}O_8$. Strophanthidin, the product of decomposition of the glucoside, is described as having an intensely bitter taste and a neutral reaction, and as being very slightly soluble in water, moderately soluble in cold and freely in warm rectified spirit. It is extremely active as a pharmacological agent, with symptoms closely resembling those of strophanthin. Strophanthin was also found to be present in the comose appendages and the seeds, the pericarp of the follicles, the leaves, branches, stem and root. No alkaloid was detected, but in the lead precipitate from an aqueous solution of the alcoholic extract a compound was found, of strongly acid reaction and freely soluble in water, to which the name of "kombic acid" has been given.

On Narceine.—Recent statements as to the extent to which commercial narceine is affected in its therapeutic action by contamination with other alkaloids, together with the paper by Merck on chemically pure narceine, seem to have constituted the *raison d'être* of the next paper, by Mr. Dott, on Narceine and its Salts. Mr. Dott is of opinion that considering the facility with which narceine can be separated from morphine and codeine it is highly improbable that any manufacturer would send out the alkaloid so contaminated; but even supposing that some morphine and codeine were present in the narceine it is difficult to conceive how they would affect its action. With respect to Merck's paper, Mr. Dott points out also that the tenacity with which narceine retains hydrochloric acid had been previously recorded by Dr. Wright, who obtained pure narceine from the basic hydrochloride by converting it first into sulphate.

As to the nature of the basic hydrochloride, Mr. Dott does not think it to be a mixture or compound of the normal hydrochloride with the alkaloid, but that in it so many molecules of alkaloid are loosely combined with so many molecules of hydrochloric acid, after the manner of the relation of water of crystallization to a salt molecule.

Lemon Juice.—The official standard of the citricity of lemon juice was the subject of the next paper, in which Mr. T. Howell Williams expressed the opinion that this is now fixed much too high. In the B.P., 1867, the specific gravity was stated as 1·039 and the contents of a fluidounce in citric acid as 32·5 grains; in the B P., 1885, the specific gravity is given as 1·035 to 1·045 and the citric acid as 36 grains to 46 grains to the fluidounce. In Mr. Williams' opinion, 30 to 36 grains of citric acid in the ounce would more correctly represent the amount present in the lemon juice as commonly obtained from the finest imported fruit during the winter months, and from 20 to 30 grains when the juice is pressed in summer and autumn. In support of this opinion he quoted some memoranda from the laboratory books of his firm.

Tannin: its Solubilities, etc.—Mr. B. S. Proctor recorded a very large number of experiments, undertaken with a view to get an explanation of the somewhat anomalous behaviour of tannin towards ether. According to the B.P., tannic acid is only sparingly soluble in ether, but Mr. Proctor confirms some previous observers in the statement that ether is really capable of forming a solution with a relatively large quantity of that compound. What appears to happen when commercial tannin is added to methylated ether is that after a time two ethereal layers are formed, one heavy and turbid, and the other light and clear, and that with successive additions of tannin the lower stratum increases in bulk and the upper one decreases and finally disappears. In one experiment this point was reached when 180 grains of tannin had been added to about 235 grains of ether, and the liquid then yielded on filtration a very small quantity of insoluble matter and was still unsaturated. The experiments were varied in many ways, involving higher rectification of the ether and drying of the tannin, but the nature of the solution, whether one of ether in tannin or tannin in ether, or whether an etherate is formed, cannot yet be said to be demonstrated The solubilities of tannin in water, alcohol, and other menstrua, were also given.

Wild Cherry Bark.—The next paper, by Mr. L. W. Hawkins, dealt with the subject of the amount of hydrocyanic acid occurring in wild cherry bark and the proportion of this which finds its way into pharmaceutical preparations of the bark. Six samples of bark from leading houses, examined by distilling the finely powdered drug with water and titrating the distillate with centinormal silver nitrate solution, gave results corresponding to a yield of hydrocyanic acid ranging from 0·079 per cent. to 0·160 per cent. The preparations in use are the liquid extract, infusion and syrup of the U.S.P. and the tincture of the B.P.C. Formulary. Commercial specimens of the liquid extract, which is supposed to represent its weight of bark, gave very poor results, the highest quantity of hydrocyanic acid in any of six samples being 0 030 grams in 100 cc., and in two cases none at all. A sample made by the author strictly according to the U.S.P. formula from a bark containing 0·137 of acid only contained in the finished product 0·084 per cent., apparently showing that the portion of the menstruum not subjected to the influence of heat is insufficient to extract the whole of this constituent. Commercial samples of the infusion and syrup also gave results considerably below the theoretical quantity, supposing that they were made from average quality bark, although it was demonstrated that a much nearer approximation could be obtained by following the U.S.P. processes. A similar remark applies to commercial samples of the tinctura pruni virginianæ B.P.C. The author, therefore, drew the conclusions that preparations of wild cherry bark do not, as a rule, represent the full value of the drug, so far as hydrocyanic acid, its supposed active constituent, is concerned, and that this might be caused by loss of acid in keeping or insufficient care in preparation.

Concentrated Infusion of Gentian.—Mr. Johnston raised the old vexed question of concentrated infusions, with a view to the introduction of such preparations in the next edition of the British Pharmacopœia. In order to give a practical turn to the discussion, he suggested the following formula for a concentrated infusion of gentian :

"Take of—

Bitter orange peel, bruised	of each, 3 ounces.
Gentian root, bruised	
Fresh lemon peel	6 ounces.
Rectified spirit	7½ fluidounces.
Cold distilled water	15 ounces.
Boiling distilled water	A sufficiency.

Mix the orange peel and gentian root with the spirit and cold water, and, into the mixture contained in a suitable vessel, such as a wide-mouthed jar to which a bung can be fitted, grate the lemon peel. Macerate for seven days, stirring occasionally: strain through a press bag or piece of calico, and press out the rest of the infusion. Remacerate the marc with about twelve ounces of boiling distilled water for twelve hours, and again press. Mix the liquid obtained with the previous portions, and set aside for a few days, afterwards filtering and making up with distilled water to a pint and a half."

In respect to the lemon peel, it was recommended that the yellow portion should be grated from previously weighed lemons (about six will be required) directly into the liquor, and as much of the spongy part as may contain essential oil pared off and added also, the quantity being checked by noting the loss of weight in the lemons. Such a preparation, when mixed with seven parts of distilled water, was stated to yield a liquid exactly the same in color, aroma and bitterness as the freshly-made B.P. infusion. Recognizing the possibility of an objection that the formula would yield a weak tincture rather than an infusion, Mr. Johnston thought this would be hypercritical, and suggested that where the physician wanted to avoid even this quantity of alcohol he might order "inf. gent. co. recent." It was admitted, however, that all the infusions might not be so easily represented by concentrated preparations.

Tincture of Lemons.—As a sequence to the previous paper, Mr. Johnston sent a note suggesting a modification in the official formulæ for the tincture of lemon and tincture of fresh orange peel, which consisted practically in adopting the method proposed for grating the peel.

On Official One per cent. Solutions.—In a paper read at an evening meeting of the Pharmaceutical Society in Edinburgh last year, Mr. Macpherson criticized the formulæ given in the British Pharmacopœia for what are known as the 1 per cent. solutions, on the ground that they do not yield preparations in accordance with their reputed strength. The strychnine solution especially was singled out as one in which the proportional parts formula differs from that in which imperial weights and measures are used, and an amended formula was given by which it was claimed that a true 1 per cent. solution could be obtained whether the imperial weights and measures or the proportional quantities were used. Following up a suggestion made by Dr. Attfield, Mr. Macpherson has since extended his work and now presented a series of formulæ for the other liquors constructed on the same principle. For the sake of uniformity imperial quantities for eight ounces of solution are given in each case; otherwise official data have been adhered to as far as consistent with bringing the finished products into consonance with their reputed strength.

On Liquor Morphinæ Meconatis.—Following up his work on the official liquors still further, Mr. Macpherson proposed in another note that solution of meconate of morphine should be brought into uniformity with the other alkaloidal solutions, and made to contain one per cent. of meconate of morphine instead of about 1¼ per cent. of the "bimeconate," as stated in the present official formula. For this purpose he has contrived two formulæ, one starting with morphine meconate and the other with morphine hydrate. Mr. Macpherson also proposes that the name of the preparation should be changed to "Liquor Morphinæ Meconatis," as being more correct than the present official one, the "bimeconate" having been shown by Dott in his Journal to be a hypothetical compound.

Strength of Prussic Acid.—In view of the fact that solutions supplied as Scheele's prussic acid are known to vary in strength, Mr. Wright's report on the strength of some commercial samples examined by him serves a useful purpose. It appeared that the range in twelve commercial samples was between 3·6 and 5·7 per cent. of HCy, or a difference of no less than 2·1 per cent. Mr. Wright suggests that the Formulary Committee might do something towards securing more uniformity in the strength of this potent agent.

Menstrua for Aconite and Belladonna.—With a view to ascertaining whether chloroform presents any advantages over alcohol in the extraction of aconite and belladonna, as suggested in Squire's "Companion," Mr. Wright made a series of experiments using alcohol, chloroform and mixtures of alcohol and chloroform in different proportions as menstrua. With belladonna the best results were obtained with a mixture of four parts of alcohol and one of chloroform, 20 cc. of a tincture made by maceration and percolation of 50 grams of the powdered root with sufficient menstruum to produce 100 cc. containing 40 milligrams of alkaloid, against 30 milligrams contained in the same quantity of a rectified spirit tincture, and 11 milligrams in a chloroform tincture. In the case of aconite the best results were obtained with a mixture of three volumes of alcohol and one of chloroform, 20 cc. containing 76 milligrams of alkaloid against 66 milligrams in the alcoholic tincture and 34 milligrams in the chloroform tincture.

Sodium Salicylate.—A third note by Mr. Wright related to an impurity observed in a sample of commercial sodium salicylate, which was not easily and completely soluble in cold water. An examination of the insoluble residue left no doubt that it consisted of salicylic acid.

On Casearia Esculenta.—The last paper read was a contribution from India, being an account, by Dr. Mootooswamy, of Tanjore, of a drug said to be coming into use as a remedy for chronic enlargement of the liver, hepatic obstructions, piles and diabetes. It consists of the root of *Casearia esculenta*, bearing a native name owing its origin to a "supposed property of drying up the sea." According to an analysis by Mr. D. Hooper the root contains 3 per cent. of neutral resins soluble in ether and partly soluble in spirit, an organic acid having the characters of cathartic acid, and about 10 per cent. of a tannin giving a green color with ferric chloride, which, however, does not prevent the drug from acting as an aperient.

The officers elected are: President, C. Umney, F. I. C., F. C. S.; Vice-Presidents, M. Carteighe, F. I. S., F. C. S.; L. Plowman, F. R. C. S., A. Kinninmont, W. Smeeton; Treasurer, W. Martindale, F. C. S.; Hon. General Secretaries, W. A. Naylor, F. I. C., F. C. S., and J. C. Thresh, D. Sc., M. B.; Local Secretary, F. W. Branson. Next year the Conference will meet in Leeds.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

The Georgia Pharmaceutical Association held its 14th annual meeting July 23d and 24th, President W. S. Parks in the chair. The papers read were on counter prescribing, therapeutic use of antipyrin, new preparations for the pharmacopœia, percolation, and preparation of fluid extracts. T. A. Cheatham, Ph. G., Macon, was elected President; H. R. Slack, Jr., Ph. G., La Grange, secretary, and H. M. Taylor, Macon, Ph. G., treasurer. The next meeting will be held in Macon, April 15th, 1890.

The Illinois Pharmaceutical Association met August 10th in Quincy at its tenth annual meeting, President Henry Smith presiding. Papers were read on the manufacture of glucose and grape sugar, by Mr. A. E Ebert, and on the status of pharmacy, by Mr. C. S. Hallberg and H. C. Martin. The president for the ensuing year is Hermann Schrœder, Quincy; secretary, H. C. Martin, Chicago, and treasurer, D. J. Dyson, Bloomington. The next meeting will take place at Kankakee, on the second Tuesday of August, 1890, with Mr. Freese as local secretary.

The Indiana Pharmaceutical Association convened at its eighth annual meeting in Indianapolis, June 4th; Prof. A. L. Green presided. The papers read were on emulsions, the use of the metric system, commercial pancreatin, liquor pancreaticus, quinine sulphate and thymol. Albert Allen, Greencastle, was elected president; J. A. Perry. Indianapolis, secretary, and H. C. Pomeroy, Indianapolis, treasurer. Maxinkuckee will be the place of the next meeting.

The Iowa Pharmaceutical Association assembled at its tenth annual meeting at Dubuque, June 5th; President R. W. Crawford in the chair. The topics discussed in the papers were trade interests; patent medicines; night clerks; commercial C. P. acids; and sodium sulphate, etc. W. H. Torbert, Dubuque, was elected president: Dr. Rosa Upson, Marshalltown, secretary, and J. B. Webb, De Witt, treasurer. The executive committee will select the day when the next meeting will be held at DesMoines.

The Massachusetts State Pharmaceutical Association convened its eighth annual meeting in New Bedford, September 10th; President B. F. Stacey in the chair. The chief topics of discussion were, the license question and the interchange of certificates of registration by state boards of pharmacy; the latter measure is favored by the Association. An attempt will be made to have future exhibitions less burdened with fancy and similar articles, and to make them more practical and instructive. L. M. Snow, Fairhaven was elected president; J. W. Colcord, Lynn, secretary, and J. B. Nichols, Salem, treasurer. The date of the next meeting, to be held at Haverhill, will be announced hereafter.

The Minnesota State Pharmaceutical Association.—The fifth annual meeting was held in St. Paul, June 11. Perhaps the most important business transacted was the consideration of the establishment of a School of Pharmacy in the State University. The project was endorsed by the Association with the understanding that the school should be entirely independent of the medical department, and that the different branches should be taught by men fully competent for the respective positions. The Committee having the matter in charge consists of S. R. McMasters, St. Paul; J. P. Allen, St. Paul; G. A. Gottwald, St. Paul; S. W. Melendi, Minneapolis and C. L. Roos, New Ulm. E. F. Allen, Ph. G., Minneapolis, was elected president; Karl Simmon, St. Paul, secretary; and C. L. Roos, New Ulm, treasurer. Minneapolis is the place for the next meeting, to be held June 11, 1890.

The Missouri Pharmaceutical Association began its eleventh annual meeting at Pertle Springs, June 18, Prof. J. M. Good, presiding. Among the papers read were several on general topics and miscellaneous notes; on ammonium iodide (see p. 464); fluid extracts; fermentation of syrups; ointments; adulteration of mustard, etc. The president for the current year is C. E. Corcoran, Kansas City; secretary, G. H. Klie, St. Louis; treasurer, G. L. Meyer, St. Louis. The council will name the day when the next meeting at Excelsior Springs is to be held.

The New York State Pharmaceutical Association met in Binghamton, June 4, at its tenth annual meeting, Dr. R. G. Eccles, president. The association recommended for the pharmacopœia the adoption of solids by weight and liquids by measure. The interchange of certificates by state boards of pharmacy was deemed impractible; but a national pharmacy law was favored in case a suitable one could be framed. Among the papers read was one by Prof. Bedford on pharmacopœial standards, and one by Dr. Eccles on the order of leguminosæ. Willis G. Gregory, Buffalo, was elected president; C. W. Holmes, Elmira, secretary; and C. H. Butler, Oswego, treasurer. The executive committee will fix the date of the next meeting which will be held in Auburn.

The North Dakota Pharmaceutical Association held its fourth annual meeting in Fargo, August 7th, President Valentine occupying the chair. The business transacted was merely of a routine nature. The Association has a membership of 160. The new executive officers are L. C. Christian, Fargo, president; H. L. Haussamen, Grafton, secretary, and E. C. Maxey, Fargo, treasurer. The next meeting will take place on the first Tuesday of August, 1890, at a place to be designated by the officers.

The North Carolina Pharmaceutical Association met at Durham, May 21st; T. D. Crawford, president. Besides the transaction of routine business, resolutions were passed against the continuation in pharmacopœial formulas of parts by weight; in favor of the reduction or complete repeal of the internal revenue tax on alcohol, etc. Dr. J. W. Croon, Maxton, was elected president;

E. V. Zoeller, Tarboro, secretary, and A. S. Lee, Raleigh, treasurer. Morehead City was selected as the place of the next annual meeting, the date to be named by the secretary.

The Ohio Pharmaceutical Association commenced its eleventh annual meeting in Mansfield, June 5th, President Fulton in the chair. Papers were read on glycerin by E. S. Ely and J. G. Spenzer; powdered borax by Mary H. Spenzer; chlorinated lime by J. G. Spenzer; nux vomica by W. Simonson; uncertain medicines by Professor Lloyd. The president for the current year is L. Sherwood, Columbus; secretary, L. C. Hopp, Cleveland; treasurer, F. A. Kautz, Cincinnati. The Association will meet next year at Toledo, in the month of June.

The South Dakota Pharmaceutical Association convened at its fourth annual meeting in Aberdeen, August 20th. Papers were read on medicated waters, prescriptions, pharmacy laws, and on several commercial topics. The membership is about two hundred. R. A. Mills, Aberdeen, was chosen president; I. A. Kieth, Lake Preston, secretary, and L. T. Dunning, Sioux Falls, treasurer. The Association will meet again at Watertown, on the third Tuesday of August, 1890, E. Murphy acting as local secretary.

The Virginia Pharmaceutical Association held its eighth annual meeting at Old Point Comfort June 6, E. A. Craighill, president. Besides the usual routine business, action on the reports of officers and committees, etc., papers were presented and discussed on benzoic acid as an antiseptic; on pharmacodynamics; on commercial sodium bicarbonate; on the study of botany, and a number of practical notes contributed by several members. R. H. Stratton, Gordonsville, was elected president; C. B. Fleet, Lynchburg, secretary, and F. H. Masi, treasurer. Mr. Masi having since died, C. H. Lumsden, Lynchburg, was appointed treasurer *pro tempore*. The selection of the place and time for the next annual meeting has been entrusted to a committee, and it has been recently suggested that the meeting be held simultaneously with that of the Americn Pharmaceutical Association.

The Proceedings, issued in August, make a pamphlet of seventy-three pages. The membership exceeds two hundred, besides seven honorary members.

The Wisconsin Pharmaceutical Association assembled at its tenth annual meeting in Portage August 13, President J. C. Huber in the chair. The president's address, the reports of officers, committees and of the pharmacy board, were received and properly disposed of; the organization of a mutual fire insurance company was favorably considered, and a number of papers were read and discussed. W. M. Edwards, Portage, was elected president; E. B. Heimstreet, Janesville, secretary; W. P. Clarke, Milton, treasurer, and C. S. Little, Appleton, local secretary. The eleventh annual meeting will be held at Appleton on the second Tuesday of August, 1890.

In addition to the printed proceedings previously noticed, the following have been received:

Province of Quebec.—Nineteenth annual meeting, held June 11, 1889.
Kansas.—Tenth annual meeting. Pp. 98. See p. 377.
Kentucky.—Twelfth annual meeting. Pp. 96. See p. 377.

EDITORIAL DEPARTMENT.

Delegates to the Pharmacopœial Convention.—President Charles Bullock has appointed the following delegates from the Philadelphia College of Pharmacy to the Decennial Convention for the Revision of the U. S. Pharmacopœia, which will convene in Washington, D. C., in May next: Alfred B. Taylor, Ph. M., Professor John M. Maisch and Professor Joseph P. Remington.

President Emlen Painter, of the American Pharmaceutical Association, has made the following appointments for the same Convention: *Delegates,* Edward R. Squibb, M. D., Brooklyn: Albert E. Ebert, Ph. G., Chicago, and Charles Mohr, Ph. D., Mobile. *Alternates,* Alfred B. Taylor, Ph. G., Philadelphia; Carl S. N. Hallberg, Ph. G., Chicago, and Maurice W. Alexander, Ph. G., St. Louis.

International Medical Congress.—When, in 1887, the Ninth International Medical Congress was held in Washington, the city of Berlin was selected for holding the Tenth Congress. Notice has recently been given, over the signatures of Von Bergmann, Virchow and Waldeyer, that the Congress will convene August 4th, and close August 9th, 1890.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Twenty fifth Annual Report of the Alumni Association, with the exercises of the 63rd Commencement of the Philadelphia College of Pharmacy for the year 1888-89. 8vo. Pp. 256.

The publication contains the minutes of the Executive Board, of the social meetings and of the annual meeting; and accounts of the reception to the graduates, of the beginning of the course and of the commencement exercises, followed by obituary notices, and lists of active members, of the graduating class, &c. The pamphlet may be obtained from the secretary of the Alumni Association, Wm. E Krewson, Ph. G.

Pharmacographia Indica. A history of the principal drugs of vegetable origin met with in British India. By William Dimock, Brigade Surgeon, Bombay Army, Principal Medical Storekeeper to Government; C. J. H. Warden, Surgeon-Major Bengal Army, Professor of Chemistry in the Calcutta Medical College, and David Hooper, Quinologist to the Government of Madras, Ootacamund. London: Trübner & Co. 1889. 8vo. Pp. 304.

Each one of the three authors is well known as a writer on East Indian Materia Medica, and would seem to be competent to write a graphical history of the medicinal plants of India; the three authors, by joint labor, it may be expected, will produce a work thorough and reliable in every way, and fully up to the requirements of science of the present day. Part I of the work now before us comprises only the medicinal plants of a portion of the polypetalous orders of dicotyledons, commencing with the Ranunculaceæ and closing with the Simarubeæ and some of the Burseraceæ. Each article, as nearly as may be, is treated of under the following heads: Figures (giving some of the works containing illustrations of the plant); Habitat; Vernacular; History and Uses; Description; Chemical Composition; Commerce. It is scarcely necessary to state that the literature on each subject has been fully made use of, and that the authors' intimate familiarity with the drugs has enabled them to give of each as full and detailed an account as its importance or presumed value seemed to demand. There is no doubt that the numerous remaining drugs of India will receive the same thorough attention, and we then may expect to have a standard work on Indian Materia Medica, and an authority on all subjects relating thereto. We look forward, with a great deal of interest, to the appearance of the remaining parts of the work, of which we shall duly apprise our readers.

Book on the Physician himself, and things that concern his reputation and success. By D. W. Cathell, M.D, Baltimore, Md. Philadelphia and London: F. A. Davis, publisher. 1889. 8vo Pp. 298. Price $2.00.

An admirable book, full of good, sensible, practical advice for the physician in his intercourse with the patient, the pharmacist, the medical profession and the general public. The keynote of the whole appears to us to be embodied in the following terse suggestions, which are equally applicable for persons busy in other spheres: "First, last, and in the midst of all, you should, as a man and as a physician, always, and above all else, keep whatever is honest, whatever is true, whatever is just, and whatever is pure, foremost in your mind, and be governed by it."

Starting from such an excellent foundation, the advice cannot be otherwise than laudable and worthy of consideration; but when, in addition to this, unbiased observation and reflection become factors, then it becomes truly acceptable. Undoubtedly there are some points in which others may differ from the views of the author; but these are expressed in such a convincing yet unobtrusive manner as to command respectful attention.

We cannot, as we should like to do, quote from the different chapters; but we cannot refrain from transcribing, at least, the beginning and closing parapraphs of Chapter X., which deals with the relations of the physician and pharmacist, to show the spirit in which the book has been written. The author says:

"Be just and friendly toward every worthy pharmacist. Owing to the close relationship and mutual dependence between pharmacy and medical practice, the pharmacists are your natural allies, and should receive your firm friendship and respect. Probably all physicians will agree that in the ranks of no profession can a greater proportion of gentlemen and manly men be found than in the pharmaceutical. This, and your joint interests, should make you brothers."

And he closes the chapter with the following:

"Bear in mind that the Sons of the Mortar and Pestle are only human, with long hours and short pay, and that they, like other persons, require some *rest* and relaxation from their drug-mixing and drug-selling slavery; and do not order mixtures requiring tedious manipulations, or direct filthy ointments to be mixed, or dirty plasters to be spread, suppositories to be moulded, or other unpleasant duties to be performed on Sunday, or during sleeping hours, unless they are urgently needed."

While occasionally a sketch is somewhat overdrawn—like the ten to one customers being presented at the drug store with one or two quack almanacs—the entire work makes the impression of a conscientious endeavor to weigh all possible conditions in the full light that can be thrown upon them from all sides. This, as well as the impressive language—perhaps occasionally somewhat quaint, but always attractive—will secure for the book the earnest attention of the medical readers; and we think that pharmacists and laymen could not but read it with a clearer understanding of the duties of the true physician, the many difficulties he has to encounter, and the many obstacles he has to overcome, in his intercourse with others, and, therefore, of their own relations to the worthy practitioner.

Electricity in the Diseases of Women, with special reference to the application of strong currents. By G. Betton Massey, M. D., Physician to the Nervous Department of Howard Hospital, etc. Philadelphia and London: F. A. Davis, Publisher, 1889. 12mo., pp. viii and 210. Price, $1.50.

A portion of the introductory part of this work has been previously published in the shape of papers contributed to the *Philadelphia Medical Times.* The aim of this part is to briefly present the laws of electricity, as applied to the branch of medicine and surgery mentioned on the title page, and yet make the medical reader familiar with the apparatus and the intelligent use of the same in applying and controlling the current. The greater portion of the book speaks of the electrical treatment of the diseases of women, giving the author's observations and the experience of other prominent writers on this subject. Nearly forty illustrations are used in the text, and a well arranged index and glossary facilitate reference to special portions.

Universal-Pharmakopöe. Eine vergleichende Zusammenstellung der zur Zeit in Europa und Nordamerika glütigen Pharmakopœen von Dr. Bruno Hirsch, Göttingen: Vandenhoeck & Ruprecht.

Universal Pharmacopœia. A comprehensive comparison of the pharmocopœias at present in force in Europe and in North America.

Referring to our previous notice of this valuable work on page 103 of the present volume, we merely state now that the fascicles 5 to 8, now before us, carry the work to No. 3032 Syrupus Acidi tartarici. It is, therefore, sufficiently advanced to insure its completion in a very short time.

Étude sur les Produits de la famille des Sapotées. Par Louis Planchon, Docteur en Médecine, etc. Montpellier: Hamelin Frères. 1888. 8vo., pp. 121.

On the products of the order of Sapotaceæ.

An interesting monograph which, after an introduction, gives the general characters of the order, its affinities, geographical distribution, and the arrangement of the genera according to Pierre and to Bentham and Hooker. The main portion of the monograph treats of the products of the order under the following heads: milkjuices (gutta-percha, balata and massaranduba), woods, flowers (mahwah), comestible fruits (starapple, sapotilla plum, marmelade, etc.), and fats (galam butter, fulwa butter, etc.). In relation to medicinal uses, quite a number of species are enumerated and more or less extensively described; these medicinal plants belong to the genera, Lucuma, Chrysophyllum, Sideroxylon, Argania, Labatia, Achras, Bassia, Butyrospermum and Mimusops. A bibliographical table, covering six pages, gives the titles of a large number of books, and of essays referring to the subject matter of the monograph.

Ueber die Verbreitung Chemischer Verbindungen in der Pflanzenwelt. Von. Ed. Schär. 8vo., pp. 31.

On the distribution of chemical compounds in the vegetable kingdom.

This is a reprint from the *Swiss Weekly Journal of Pharmacy* of a lecture delivered by Professor Schaer some months ago. The subject is a very interesting, and at the same time a very important one, and is presented by the author in a very comprehensive manner. After an introduction and the consideration of widely distributed compounds (inorganic substances, carbohydrates, acids and coloring matters), the special principles receive attention, and the following groups are pointed out: alkaloids, fat acids, aromatic acids, phenols, kinones and ketones, volatile oils, special coloring matters and glucosides and bitter principles.

La Pharmacie à Montpellier depuis son origin jusqu'à la révolution Étude historique d'après des documents originaux. Par A. P. Marty, pharmacien de 1re classe. Montpellier: Gustave Firmin, 1889. 8vo. Pp. 115.

Pharmacy in Montpellier from its origin to the revolution. Historical study based upon original documents.

After a brief historical introduction on the origin of pharmacy the author proceeds to the local history of pharmacy in Montpellier, and quotes the oldest known document relating to it which was issued in the Latin language in 1340 and is entitled: De visitandis appothecariis. The chief vicissitudes of pharmacy are then described, how it became completely dependent upon the medical profession, but during the sixteenth and seventeenth centuries sought to gain its autonomy, until after having been under the supervision of the University of Medicin, it finally succeeded to gain a foothold distinct from its older sister. A powerful impulse was given to the movement by the revolution and on December 18th, 1790, apothecaries were admitted to the Public Health Commission.

Étude sur les différents procédés employés dans la determination de l'astigmatisme. Par Émilien Grimal, Licencié ès-sciences physiques et chimiques, etc. Montpellier: Gustave Firmin, 1889. 8vo. Pp. 82.

On the different methods employed for the determination of astigmatism.

The methods proposed by different German, French and English physicians are described and compared, likewise the various apparatus that have been used for this purpose and which have become known as astigmatoscopes, optometers and ophthalmometers.

OBITUARY.

Dr. Anton Geuther, professor of chemistry at the University of Jena, died there August 25th in the fifty-seventh year of his age. He was born in Neustadt, Saxe-Coburg, graduated 1855 in Göttingen, and since 1863 labored at Jena. He was the author of a valuable "Lehrbuch" of chemistry, and of numerous papers on chemical subjects, which originally appeared in *Liebig's Annalen* and in *Berichte*, and comprise many compounds of pharmaceutical interest, like chromium compounds, various sulphites and sulphides, lead oxides, ethers, chloroform, iodoform, bitter principle of calamus, &c.

Dr. Oscar Jacobsen, professor of chemistry in the University of Rostock, died in that city August 24, in his fiftieth year. He was born in Holstein, became a pharmacist, serving as apprentice and assistant for nine years, in 1865 passed the State's examination and then continued the study of chemistry as Prof. Himly's assistant, receiving the decree of Phil. Dr. in 1868. Since 1873 he held the chair of chemistry in Rostock. Among his scientific labors are researches on bile, on ketones, on chlorine derivatives of ether and aldehyd, and particularly on the aromatic hydrocarbons and their derivatives, notably the sulfo acids. He contributed a number of articles to Ladenburg's Dictionary of Chemistry (Handwörterbuch), of which those on the alkaloids and the glycosides are perhaps the most important ones for pharmacists.

Dr. August Vogel, professor of agricultural chemistry in Munich, died August 14th, aged 72 years. He was the son of Prof. Dr. H. A. von Vogel, who, during the early part of the present century, was well known as a teacher of chemistry, first in Paris and afterward in Munich, and who, in 1868, died in his ninetieth year. The younger Vogel, who was born in Munich, August 4th, 1817, studied medicine, graduated in 1839, then became assistant to his father, and since 1848 belonged to the University of Munich as extraordinary professor, and since 1869 as full professor. Besides several separate works on various topics, he was the author of numerous scientific papers, which were mostly contributed to Buchner's *Repertorium*, a number of which were re-published in the AMERICAN JOURNAL OF PHARMACY previous to 1870.

Henry J. Menninger, M.D., died in Brooklyn, September 8th, in the fifty-second year of his age. He was born near Mainz, Germany, and at the age of twelve years came to this country, his father, a physician, settling in New York, where Henry learned the drug business and afterwards studied medicine in the medical department of the University of New York. In 1861 he enlisted as a private, was promoted to lieutenant, was wounded on the battle-field in Virginia, and afterward became post surgeon at Newbern, N. C. After the close of the war, he was for some time editor of the Newbern *Republican*; was then elected secretary of the State of North Carolina, and after the expiration of his term of office engaged in the drug business in Raleigh. Since 1873 he has been living in New York and Brooklyn, where he carried on the drug business. In Brooklyn he was elected to the office of an alderman and of coroner, and was a trustee of the Germania Savings Bank. For about sixteen years he was a member of the New York College of Pharmacy, and most of the time one of its vice-presidents, and a member or chairman of the examining committee. In 1866 he joined the American Pharmaceutical Association; first attended the meeting of 1869, but after his removal to New York was frequently present, and served the Association on many committees, and from 1886-87 as first vice-president. Dr. Menninger was a man of clear conceptions and earnest efforts, firm in his convictions, and ready to aid by word or deed what he considered to be to the interest of the Association or his chosen profession. His expressive voice commanded attention no less than his logical thoughts; he was not only a good speaker, but also a good counseller.

Charles Moritz Rebner, Ph.G., class 1885, Philadelphia College of Pharmacy, died at his home at Atchison, Kansas, August 1st, of consumption, aged 25 years. He was a promising young man, and a favorite with his classmates.

THE AMERICAN
JOURNAL OF PHARMACY.

NOVEMBER, 1889.

THE SYNTHESIS OF ALKALOIDS.

By Professor Samuel P. Sadtler, Ph. D.

From an Introductory Lecture to the 69th course of the Philadelphia College of Pharmacy.

While this introductory lecture is not designed to be one of the special chemical course, it is fitting that, as Professor of Chemistry, I should present to you some general observations taken from that branch of science.

Six years ago, in opening the course of 1883-84, I took as a subject for some remarks "Recent Studies on the Constitution of the Alkaloids." I propose to look at that subject again for a few minutes this evening, and to combine with it some mention of several classes of compounds of equal medicinal and pharmaceutical importance, viz.: the hypnotics, antiseptics, and antipyretics of synthetic manufacture, that have been so numerously brought forward in the last few years.

In the lecture of 1883, reference was made to the fact that recent discoveries pointed strongly to the derivation of many of the alkaloids from either pyridine C_5H_5N or quinoline C_9H_7N. Since that time this relation has been clearly established in a large number of cases, and several of the alkaloids have been made by distinct synthesis from pyridine and its derivatives. On the other hand, it has been shown that some of the organic bases found in the vegetable kingdom stand in much closer relation to the bases found in the animal organism, such as urea, than they do to the other plant bases. Thus caffeïne and theobromine are undoubtedly urea derivatives, while quinine and morphine show no relation whatever to this base, but are pyridine derivatives.

Königs, therefore, has proposed to limit the name alkaloid to the second of these two classes, and to define as alkaloids "those organic bases found in the plant kingdom, which are pyridine derivatives," and we doubt not that this will be the gradual practice as the different plant bases become more fully studied.

Quite an additional amount of literature on this subject has accumulated within the last six years, and we will therefore briefly refer to some of these newer results. First, clearer ideas of the general underlying compounds have been obtained. It has been seen that these compounds, pyridine C_5H_5N, quinoline C_9H_7N, and acridine $C_{13}H_9N$ correspond to benzene C_6H_6, naphthalene $C_{10}H_8$ and anthracene $C_{14}H_{10}$, and have analogous relations with each other; that the stability and behavior towards reagents of analogous derivatives, for instance of benzene and pyridine, exactly correspond; that the reducibility of the molecules is perfectly analogous. As from benzene hexahydrobenzene is obtained, so from pyridine hexahydropyridine, as from naphthalene tetrahydronaphthalene is obtained, so from quinoline tetrahydroquinoline, as from anthracene dihydro-anthracene, so from acridine dihydro-acridine. These are also in each case the most stable of the hydrogen addition products.

Of the derivatives of pyridine, one of the simplest and best studied is hexahydropyridine, or piperidine as it proves to be. It can be formed from piperine, the alkaloid of pepper, direct from pyridine by the action of reducing agents, or as Ladenburg has shown, from pentamethylene diamine.

Conine, the alkaloid of hemlock, which in my previous lecture I said was probably derived from propyl-piperidine, has since been made synthetically by Ladenburg and its nature and derivation clearly shown. It is the dextro-rotatory *a* normal propyl-piperidine. In obtaining it, pyridine is first converted into *a* allyl-pyridine, which reduced by sodium in alcoholic solution yields an optically inactive *a* normal propyl-piperidine. The tartrate of this base is made and crystallized when, following the analogy of the splitting of racemic acid into dextro-rotatory and lævo-rotatory tartaric acid, we get a dextro and a lævo conine, of which the first is the true alkaloid of the hemlock. The inactive conine can also be made synthetically from *conyrin*, or *a* normal propyl-pyridine, by reduction with hydrogen iodide, or from *conydrin* (oxyconine), which occurs in hemlock along with conine. A. W. Hofmann has obtained three isomeric bases, *a*, *β*, and *γ* *coniceïn* of the formula $C_8H_{15}N$, and hence containing 2 hydrogen atoms less than conine. Of these bases, smelling like conine, the first and third are strong poisons.

The alkaloid *nicotine* $C_{10}H_{14}N_2$ is a derivative of dipyridyl $C_{10}H_8N_2$ and apparently hexahydrodipyridyl $C_{10}H_8(H_6)N_2$. The two dipyridyls known (the para and the meta compounds) yield, when reduced, hexahydrodipyridyls (isonicotine and nicotidine) isomeric, but not identical with nicotine. The *nicotinic acid,* obtained by the oxidation of nicotine with chromic or nitric acid, or with potassium permanganate, has been shown to be simply β pyridine-monocarboxylic acid $C_5H_4N.COOH$.

If we turn now to the alkaloid *atropine* $C_{17}H_{23}NO_3$ which, as was known as long ago as 1863, splits up into *tropine* $C_8H_{15}NO$ and *tropic acid* $C_9H_{10}O_3$, we find some additional results. Tropine, according to Ladenburg, is a substituted tetrahydropyridine containing the methyl (CH_3) and the oxethyl (C_2H_4OH) groups in place of two H atoms. Tropic acid, it will be remembered, has been identified as a phenyl-oxypropionic acid. Now, if instead of tropic acid we cause to combine with the tropine another aromatic acid we get a tropeïn, of which compounds a whole class have been obtained analogous in constitution to atropine. Thus benzoic acid, the ortho, meta, and para oxybenzoic acids, phenyl-acetic acid, the two isomeric phenyl-glycollic acids (of which one is called mandelic acid), phthalic acid, and cinnamic acid have all been combined with tropine to form tropeïne. Of these, only one, that from mandelic acid known as homatropine, has proven physiologically important. Tropine, decomposed by either hydrochloric or sulphuric acids, loses a molecule of water and yields *tropidine* $C_8H_{13}N$, which has also been shown to be a tetrahydropyridine derivative with methyl (CH_3), and ethenyl or vinyl (C_2H_3) as the replacing groups. This tropidine is a liquid base with a conine-like odor.

The acid derivatives of pyridine and its homologues in which a nethyl (CH_3) group has been changed into the carboxyl group ($COOH$) have been much more fully investigated, and have shown in some cases unexpected relations to natural alkaloids. Thus, β-pyridine-monocarboxylic acid has already been spoken of as nicotinic acid; it is also produced by the oxidation of pilocarpine; one of the pyridine-dicarboxylic acids (cinchomeronic acid) is found in the oxidation of the natural alkaloids, cinchonine, cinchonidine, or quinine. This is also the case with one of the pyridine-tricarboxylic acids (carbocinchomeronic or oxcinchomeronic), which may be obtained by the oxidation of quinine, cinchonine, quinidine, cinchonidine and papaverine with potassium permanganate solution, while a second of these pyridine-tricarboxylic acids is produced by the oxidation of berberine with nitric acid.

The acids of the pyridine series are capable of furnishing very interesting addition products, the constitution of which is analogous to that of the betaïne of the beet juice. These betaïnes of the pyridine-carboxylic acids have assumed quite an importance since chemists have recognized the close relationship they bear to some of the natural alkaloids. Of the pyridine series, Hantzsch has prepared the betaïnes of nicotinic, picolinic and collidine-carboxylic acids, and Roser that of cinchomeronic acid. Quite recently Jahns has shown that the betaïne of nicotinic acid is identical with trigonelline, the alkaloid of *Trigonella foenum græcum*, and that the betaïne of cinchomeronic acid, prepared synthetically by Roser, is identical with the apophyllic acid obtained by the oxidation of cotarnine, one of the decomposition products of narcotine.

Another series of these acid derivatives of pyridine have the pyridyl residue C_5H_4N, replacing an H atom in the formula of well-known acids. Thus, β-pyridine-a lactic acid results along with trimethylamine when the natural alkaloid pilocarpine is decomposed by prolonged heating with water. Pilocarpidine, which occurs along with pilocarpine in jaborandi leaves, is β-pyridine-a dimethylamidopropionic acid. Pilocarpidine has been made synthetically by Hardy and Calmels; and this by the action of methyl iodide and caustic alkali, followed by silver permanganate, has produced pilocarpine itself. The alkaloid jaborine, which accompanies pilocarpine in jaborandi leaves, can be obtained as a decomposition product from the latter.

The action of ammonia upon certain acids found in the vegetable kingdom, such as chelidonic and meconic acids, has been found to produce acids recognized as pyridine derivatives. Thus, *comanic acid* $C_6H_4O_4$, derived from meconic acid, is changed by ammonia into an oxypicolinic acid, while *comenic acid* $C_6H_4O_5$, from the same source, yields dioxypicolinic acid; and chelidonic acid $C_7H_4O_6$, which accompanies the alkaloids chelidonine and sanguinarine in *Chelidonium majus*, yields an oxypyridine-dicarboxylic acid.

To the tetrahydro derivatives of the higher homologues of pyridine belong *ecgonine* and its products, of which latter cocaïne, the alkaloid of coca leaves, is the most important, from a physiological point of view.

Ecgonine, which, as is well known, results, along with benzoic acid and methyl alcohol, when cocaïne is heated with hydrochloric acid, has been found to be methyltetrahydropyridyl-oxypropionic acid.

Cocaïne can be made synthetically by heating this ecgonine with benzoic anhydride and methyl iodide, and a series of analogous artificial alkaloids have been made with phthalic, cinnamic, phenylacetic and isovalerianic acids, combined with the ecgonine. The production of both phenanthren and pyridine, when *morphine* is distilled over zinc dust, has been known for years, and was mentioned in my previous lecture on the subject.

Narcotine, it will be remembered, is decomposed under the influence of water into meconine $C_{10}H_{16}O_4$, and cotarnine $C_{12}H_{13}NO_3$. This latter is capable of yielding, under the influence of bromine, dibrompyridine.

Quinine is is now considered to be a derivative of a partially hydrogenated diquinoline corresponding to the formula $C_9H_6(OCH_3)N\text{-}C_9H_{11}(OH)N.CH_3$.

That *cinchonine*, fused with caustic potash, yields quinoline, and that *strychnine*, under the same treatment, yields also quinoline, together with indol, while *brucine* yields homologues of pyridine, was noted in my previous lecture, in 1883.

Perhaps of greater present interest is the manufacture in the last few years of a large number of synthetic organic compounds which, while not generally basic or alkaloidal, are equally active, physiologically, in a variety of ways. We have had considerable additions made to our list of hypnotics, antiseptics, antipyretics and analgesics. In a lecture I delivered last January before the Franklin Institute of this city on the "Debt of Medical and Sanitary Science to Synthetic Chemistry," I attempted to classify the more important of these newer synthetic remedies. They were there arranged in five groups, according to their chemical relationship.

The first group was made to comprise the derivatives of methane CH_4, and was found to include almost, if not all, of the hypnotics and anæsthetics. The list as there given was as follows:

Methylene dimethylic ether (methylal)	$CH_2(OCH_3)_2$
Ethylidene diethylic ether (acetal)	$CH_3.CH.(OC_2H_5)_2$
Tertiary amyl alcohol (amylene hydrate)	$(CH_3)_2.C.C_2H_5.OH$
Paraldehyde	$(CH_3.COH)_3$

Ethyl carbamate (urethane)	$CO\left\{\begin{matrix}NH_2\\OC_2H_5\end{matrix}\right.$
Diethyl-sulphon-dimethyl-methane (sulphonal)	$(CH_3)_2.C.(C_2H_5SO_2)_2$
Ethylic ether	$(C_2H_5)_2O$
Methylene chloride (dichlor-methane)	CH_2Cl_2
Chloroform (trichlor methane)	$CHCl_3$
Iodoform (tri-iodo methane)	CHI_3
Chloral hydrate	CCl_3CHO+H_2O
Butyl chloral hydrate (croton chloral)	$C_3H_4Cl_3,CHO+H_2O$
Ethylene chloride	$C_2H_4Cl_2$

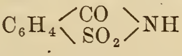
Ether, chloroform, iodoform and chloral hydrate are, of course, not new, but are added because of the analogy in both chemical and therapeutic properties. Since the publication of this lecture in March last, an additional compound has been announced under the name of "Uralium," or a combination of chloral and urethane $CO\left\{\begin{matrix}NH.CHOH.CCl_3\\OC_2H_5\end{matrix}\right.$ and with therapeutic properties analogous to those of both chloral and urethane, and a compound of chloral with formamide under the name of "chloralamid." This last has the formula $CCl_3.C\left\{\begin{matrix}OH\\NH.CHO\end{matrix}\right.$ and forms colorless crystals with a mild, slightly bitter taste. It is said to be an efficient hypnotic.

The second group comprised phenols and allied compounds, and along with a few of the older compounds, like carbolic and salicylic acids, included a number of quite recently studied substances, and was as follows:

Phenol (carbolic acid)	$C_6H_5.OH$
Cresol (cresylic acid)	$C_6H_4(CH_3).OH$
Resorcin (meta dioxy benzene)	$C_6H_4\left\{\begin{matrix}OH\\OH\end{matrix}\right.$
Hydroquinone (para dioxy benzene)	
Thioresorcin	$C_6H_4\left\{\begin{matrix}SH\\SH\end{matrix}\right.$
α-Naphthol	$C_{10}H_7.OH$
β-Naphthol	
Tri-brom phenol	$C_6H_2Br_3.OH$
Tri-chlor phenol	$C_6H_2Cl_3.OH$
Salicylic acid	$C_6H_4(OH).COOH$
Phenyl salicylate (salol)	$C_6H_4(OH).COOC_6H_5$
β-Naphthyl salicylate (betol)	$C_6H_4(OH).COOC_{10}H_7$
α Oxy-naphthoic acid	$C_{10}H_6(OH)COOH$
Orthophenol-sulphonic acid (aseptol)	$C_6H_4(HSO_3).OH$
Di-iodo phenol-sulphonate (soziodol)	$C_6H_2(HSO_3)I_2.OH$

Their general therapeutic character is that of antiseptics and antifermentatives. Since that publication there have been several additions to the list: the three compounds, ortho, meta and para cresyl salicylate, prepared by Nencki, the discoverer of salol and betol, to which they are analogous; anisic acid (methylated salicylic acid) and guiacol, the monomethyl ether of pyrocatechin. This last is now advertised as "the sovereign remedy in pulmonary tuberculosis."

The third group comprised other phenyl deviatives and included:

Acetophenone (hypnone)	$C_6H_5.CO.CH_3$
Acetanilide, or phenyl-acetamide (antifebrine)	$C_6H_5.NH.C_2H_3O$
Brom-acetanilide	$C_6H_4Br.NH.C_2H_3O$
Benzanilide	$C_6H_5NH.C_7H_5O.$
Acetyl-amidophenol	$C_6H_4(OH).NH.C_2H_3O$
Para-acetphenetidine (phenacetine)	$C_6H_4(OC_2H_5).NH.C_2H_3O$
Acetyl phenyl-hydrazine (pyrodine)	$C_6H_5.N_2H_2(C_2H_3O)$
Phenyl hydrazine-levulinic acid (antithermine	$C_6H_5N_2H(CH_3)C(CH_2)_2COCH$
Benzoyl sulphinide (saccharin)	 $C_6H_4\left\langle\begin{smallmatrix}CO\\SO_2\end{smallmatrix}\right\rangle NH$

Their therapeutic character is somewhat mixed, but in general they seem to be antipyretics and sedatives. To this list has since been added: Methyl phenyl-acetamide, or methylated antifebrin, under the trade name of "Exalgin," and para acetanisidin, or oxy-methylated antifebrin, known commercially as "Methacetin," while what appeared in my list as brom-acetanilide is now introduced as bromated antifebrin, or commercially as "Antisepsin;" and the acetylphenyl-hydrazine known at first under the trade name of "pyrodine," is now "Hydracetin."

If we make this list to include both phenyl and naphthyl derivatives outside of the phenol and naphthol class, we may also put here tetrahydronaphthylamine, which has recently been introduced and claimed to have value as a new mydriatic.

The fourth group comprised pyrrol and pyrazol derivatives, and included:

Tetraiodo pyrrol (iodol)	$C_4HI_4N.$
Diphenyl-methyl pyrazol	$C_3(C_6H_5)_2(CH_3)HN_2.$
Phenyl-dimethyl-pyrazolon (antipyrine)	$(C_6H_5)(CH_3)_2C_3HN_2O.$

No recent additions have been made to this list.

The fifth and last group comprised quinoline derivatives, and included:

Quinoline	C_9H_7N
Methyl-tetrahydro-quinoline sulphate (M Kairoline)	$C_9H_{10}N(CH_3)H_2SO_4$

Ethyl-tetrahydroquinoline sulphate (A Kairoline)	$C_9H_{10}N(C_2H_5)H_2SO_4$
Methyl-tetrahydro-oxyquinoline hydrochlorate (A Kairine)	$C_9H_{10}NO(CH_3)HCl+H_2O$
Ethyl-tetrahydro-oxyquinoline hydrochlorate (A Kairine)	$C_9H_{10}NO(C_2H_5)HCl$
Tetrahydroparaquinanisol (thalline)	$C_9H_{10}N(OCH_3)$.
Ethyl-tetrahydro-paraquinanisol(ethyl-thalline)	$C_9H_9(C_2H_5)N(OCH_3)$
Methyl-trihydro-oxyquinoline carbonate of sodium (thermifugin)	$C_9H_8(CH_3)NCOONa$

Nor has this list been recently increased.

It will thus be seen that modern organic chemistry has entered upon a very fruitful field in taking up this synthetic work, and that the problem of the constitution of the alkaloids, so long apparently incapable of solution by any methods of analysis, may yet be solved by the combination of synthetical and analytical study now entered upon. It is eminently proper, however, to remind you that, as pharmacists first isolated the alkaloids morphine and quinine, they should be preparing actively to share the glory and profit of their artificial manufacture, which is certain to come in the near future.

NOTES ON SOME INDIGENOUS REMEDIES.

By John M. Maisch.

Solanum carolinense, Michaux.—Dr. J. L. Napier, of Blenheim, S. C., having heard of the horse nettle as a remedy for epilepsy, has tried a tincture of the berries and considers it a very valuable addition to our active agents in combatting convulsive disorders. The tincture was prepared from the bruised berries and diluted alcohol, using berries enough to obtain a saturated tincture of which a teaspoonful is given every three hours until drowsiness and symptoms of vertigo are produced, when the intervals between the doses should be lengthened. A tincture prepared from the root appears to have the same effect.

According to Porcher (*Resources of the Southern Fields and Forests*) the berries have some reputation among the negroes in South Carolina as an aphrodisiac, and Valentine obtained good effects from the juice of the berries in tetanus.

This plant is found throughout the greater part of the United States, from the New England States to Mississippi and Illinois, and in some localities is quite common. Farther west it is replaced by the very prickly Sol. rostratum, and S. heterodoxum, *Dunal,* of which the former has yellow, and the latter purplish flowers.

At the last meeting of the Georgia Pharmaceutical Association (*Proceedings,* 1889, p. 52) a paper was read by Mr. H. R. Slack, Jr., on new remedies which are considered to be of sufficient importance to be admitted into the next pharmacopœia. Of indigenous remedies the paper recommends the bark of Rhamnus Purshiana *De Candolle,* and the rhizome of Helonias dioica, *Pursh,* for pharmacopœial recognition. The former drug is extensively used throughout the United States and in some parts of Europe as a mild laxative, similar in its action to frangula bark.

The second plant is now known by its botanical name Chamælirium luteum, *Gray,* and by its common names *starwort, blazing star* and devil's bit. Mr. Slack states that Dr. E. D. Pitman, of La Grange, Ga., considers it to be a tonic, vitalizer of the blood with a special tendency to the uterine functions, a fine emmenagogue, and a corrector of all the secretions of the glandular system; and that it is given in doses of ten grains three times a day, or preferably in the form of tincture, one ounce to the pint, which would require about 2½ fluidrachms per dose. The drug has been popularly employed for a long time; Porcher (*loc. cit.*) states that the Indian women used this plant in preventing abortion. The drug was examined by Dr. F. V. Greene (AM. JOUR. PHAR., 1870, p. 250 and 465), who ascertained the active principle to be a glucoside, chamælirin, which is a cardiac poison, possessing a depressing and paralyzing effect upon the heart. These researches would seem to indicate that the drug should be used with due caution.

At the same meeting of the Georgia Pharmaceutical Association a paper by J. R. Gregory, of Atlanta, was presented, treating of the manufacture of fluid extracts and tinctures from indigenous plants, and stating that of the official list of 76 fluid extracts, 36, or nearly one-half, are made from indigenous plants, and that they can be profitably gathered and manufactured in Georgia. Among the plants enumerated are the following: Atropa Belladonna, Jateorrhiza Calumba, Rhamnus Frangula and Gentiana lutea.

Of these exotics, belladonna is the only plant, I believe, which is cultivated in the United States to a limited extent; and since none of the species have been naturalized here, it becomes of interest to learn whether some indigenous plants are known in some parts of Georgia by names similar to those used for the above officinal drugs, or are similar in appearance to the plants yielding the latter. The roots of indigenous blue-flowering species of Gentiana are used as substitutes for the officinal drug; but of the seven southern species, not one has yellow flowers, like the officinal plant; the nearest approach in color is G. ochroleuca, *Froelich,* which has yellowish white or greenish white flowers. Both this and some of the blue-flowering species are sometimes known as *Sampson snake root.*

None of the three menispermaceæ of the Southern States has roots approaching in size those of the pharmacopœial calumba. The reference in the above paper, very likely, applies to the so-called *American columbo,* Frasera Walteri, *Michaux,* s. F. carolinensis, *Walter.*

In the place of the officinal frangula it is not unlikely that the *Carolina buckthorn* may be used to some extent in Georgia. Prof. Porcher (*Resources of the Southern Fields and Forests*) states that according to Mills a purgative syrup is prepared from the berries of Rhamnus (Frangula, *Gray,*) caroliniana, *Walter.* Possibly the bark of the same species may be used in some localities as a substitute for frangula bark or cascara sagrada. The shrub grows westward as far as the Rocky Mountains.

Aside from the non-prickly species of Solanum with entire leaves, the only southern solanacea having some resemblance to belladonna seems to be Nicandra (Atropa, *Linné,*) physaloides, *Gœrtner,* an emigrant from Peru, where the berries enjoy the reputation of being diuretic and antilithic; the fruit is known as *apple of Peru.* But the leaves, though smooth, differ from belladonna leaves by being of a lighter color, and by having the margin toothed or sinuately lobed, so as to resemble stramonium leaves; hence Lamarck's name for the plant, *Physalis daturæfolia.*

While it is evident that the reference in Mr. Gregory's paper must apply to four plants different from the officinal ones, among the indigenous plants used for tinctures a garden plant is mentioned, Calendula officinalis, *Linné,* which does not appear to have established itself in this country sufficiently as to deserve a place in botanical works; Chapman, in his new edition of "Flora of the Southern United States," does not mention the plant.

A COMPARATIVE ANALYSIS OF TWO LABIATÆ.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 60.

By Carvosso O. Myers, Ph. G., and Henry R. Gillispie, Ph. G.

[Read at the Pharmacuetical Meeting, October 15, 1889.]

The medicinal members of the natural order Labiatæ are frequently disposed of in the text-books with the statement that they possess the stimulant and aromatic properties and the usual constituents of the order. It was, therefore, decided to take two well-known domestic members, whose composition had not already been well made out, and determine whether they contained any unusual plant constituents and how closely they resembled each other.

Scutellaria lateriflora, which has some reputation as a nervine and in hydrophobia, was analyzed in 1824 by Cadet de Gassicourt (*Jour. de Pharmacie*, vol. x, page 439), who found traces of a bitter principle, a partly volatile material, soluble in alcohol and water, which was not apparent in the original drug, but appeared to be developed by chemical action, volatile oil, a yellow fixed oil, tannin, mucilage, sugar, etc. In the present analysis was found a bitter principle, which was removed from the drug partly by petroleum ether and ether, but completely by alcohol. On removing the alcohol, dissolving the residue as far as possible in water, agitating the aqueous solution with ether and evaporating this ethereal solution, the bitter principle was obtained in the form of stellate groups of acicular crystals.

An aqueous solution of these crystals did not reduce Fehling's solution, but on boiling with a few drops of hydrochloric acid an aromatic odor was developed, and then on neutralizing and testing with the above reagent evidence of sugar was found, showing the compound to be a glucoside. This is no doubt the bitter principle noticed by Cadet de Gassicourt, although it was found in larger quantity than found by him. The partly volatile material observed by the above investigator was not found, unless he referred to the odor developed on boiling the glucoside with acid.

The other more important consituents found were traces of volatile oil, mucilage 4·20 per cent., dextrin 2·90 per cent., glucose 2·42 per cent., ash 14·00 per cent., cellulose and allied bodies 55·28 per cent.

Nepeta Cataria.—No record of any previous analysis of this plant appears to have been published. It was found to contain ·3 per cent. of volatile oil, small quantities of fixed oil, a crystalline wax, 5·80 per cent. of mucilage, 12·62 per cent. of dextrin and glucose, 1·30 per cent. cane sugar, 35·44 per cent. cellulose, 12·50 per cent. ash, and small quantities of a bitter principle.

This last constituent was partly removed from the drug by ether, but alcohol was found to be the best solvent. On removing the alcohol, dissolving in water, agitating the aqueous solution with ether and evaporating the ethereal solution a semi-crystalline substance was obtained, which possessed a very bitter taste and an acid reaction. This substance did not reduce Fehling's solution either before or after boiling with acid and gave none of the reactions of the alkaloids.

These two drugs resemble each other in composition, although it is certain the bitter principles are different. One is a glucoside while the other is probably an organic acid. No distinct evidence of tannin in either plant was obtained.

SOME INDIAN FOOD PLANTS.

III. PEUCEDANUM EURYCARPUM, *Coulter and Rose.*

BY HENRY TRIMBLE.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 61.

[Read at the Pharmaceutical Meeting, October 15, 1889.]

This food plant was, like the preceding,[1] furnished me by Dr. V. Harvard, U. S. Army Surgeon at Fort Abraham Lincoln, Dakota, together with the following description.

"The genus *Peucedanum*, as defined by Coulter and Rose in their 'Revision of North American Umbelliferæ,' is the largest of that order. Of the 46 species therein described, 9 have edible tubers and are more or less used by the Indians as food plants. Of these 9, the species now under consideration is not one of the best, nor is it probably the worst. It is described as follows: 'Perennial herb, caulescent, branching, a foot or two high, more or less pubescent, frequently from a much enlarged tuberous root; leaves ternate-pinnately decompound, with small linear cuspidate segments; umbel 3—12 rayed, with involucels of lanceolate acuminate often united bractlets; flowers white, inconspicuous; fruit broadly elliptical, glabrous, 5 to 9 lines long, 3 to 4 lines broad, with wings as broad as body or broader, and filiform dorsal and intermediate ribs; oil tubes large, solitary in the intervals,

---

[1] AM. JOUR. PHAR., 1888, p. 593, and 1889, p. 4.

2 on the commissural side.' This species is closely allied to *P. macrocarpum* of Nuttall, in bulb and foliage, and was long considered a variety of it when at all distinguished from it. It is found from the Sacramento river in California, northward through Oregon to Washington and British Columbia. It has not yet been collected east of the Rocky Mountains. It is quite common on the Spokane river, Washington, and is there called 'skelaps' by the Indians who use it as an article of food."

"The thick root expands below into one or more irregularly oblong, often much misshapen tubers, ¾ to 1½ inch in diameter, and covered with brownish black epidermis. On section, they are found to be composed almost entirely of a white, spongy, starchy material which has a pleasant farinaceous taste."

"Of the three species of *Peucedanum* used by the Spokane Indians, the best, in size and flavor of bulbs, is the 'Chucklusa' (*P. Canbyi*, Coulter and Rose), which in their estimation is only second to Camas as native food; the next best is the 'Tuhwha' (*P. farinosum*, Geyer), and the least, the 'Skelaps' (*P. eurycarpum*)."

"The bulbs of these species, although very good and palatable when raw, are generally prepared by roasting or baking and then pounding into a flour from which a wholesome and nutritious cake or bread is made."

The following are the constituents so far as its use as a food is concerned, although the tubers undoubtedly contain small quantities of other compounds; for example, there is present a small amount of a compound of butyric acid, as was determined by allowing the powder to macerate in a warm place for some hours with water, when the characteristic odor of the acid developed.

Starch	35·06	per cent.
Albumenoids	9·63	"
Glucose	3·66	"
Saccharose	1·80	"
Mucilage	3·61	"
Resin, etc	2 68	"
Wax	2·45	"
Volatile oil	0·02	"
Ash	5·06	"
Moisture	10·30	"
Cellulose	25·73	"
	100·00	"

Tests were made for tannin, but with negative results. In 1833

Schlatter[1] discovered in *Peucedanum officinale* a neutral crystalline principle—*peucedanin.* As the present analysis was for the determination of the constituents which have a food value, and the supply of material by this work was nearly exhausted, I was unable to do more than apply Heut's[2] method for the preparation of peucedanin, to about 25 gms. of the original substance. By this means, however, a small quantity of a distinct crystalline substance was obtained, nearly pure, which, so far as could be determined, was identical with the above compound.

RESIN OF GINGER.

By Robert Glenk.

In preparing the "Liquor Zingiberis," or soluble essence of ginger of the National Formulary, the resin is separated by the addition of water to the fluid extract by the intervention of pumice in powder, which acts as a nucleus to attract the precipitated resin and allow of more rapid filtration.

On drying the pumice which remains on the filter and exhausting it with warm alcohol a solution of the resin is obtained. On the evaporation of the alcohol a semi-solid residue is left of a black color and an odor slightly differing from that of the root. Its alcoholic solution is of an acid reaction. About two-thirds of the resin is soluble in solution of potassa, and the dissolved portion is reprecipitated on adding an excess of HCl. The portion insoluble in 5 per cent. KOH dissolves in glycerin on slightly warming and is reprecipitated on diluting with warm water. It is almost insoluble in water of ammonia.

Castor oil, ether, acetic ether, chloroform and acetone completely dissolve the resin; carbon disulphide, turpentine and petroleum benzin dissolve only partially. On adding a few drops of tincture of chloride of iron to a dilute alcoholic solution, a gradual darkening in color results. In a solution in five per cent. KOH (1–10) on the addition of test solution of permanganate of potassium, a dark green color is produced which fades in half a minute. With HCl (1·160) no effect is produced. H_2SO_4, sp. g. 1·84, dissolves the resin with a black color; the solution is precipitated by the addition of water, and after washing with water the mass is almost insoluble in alcohol. HNO_3

---

[1] *Ann. Chem. und Pharm.*, v, p. 201.

[2] *Dissertation,* Erlangen, 1874.

(1·42) oxidizes the resin rapidly with copious evolution of red fumes forming a straw-colored liquid, and separating a red waxy substance as a product of the oxidation. The solution separated from the waxy substance is rendered much darker in color (yellowish red), but the reactions for picric acid, which it was supposed to be, could not be confirmed. It loses 1½ per cent. on being heated in an air-bath to 110°C.

On heating on platinum foil the resin becomes fluid, gives off acrid vapors, and burns with a luminous flame, and finally leaves a minute quantity of ash consisting of Na_2CO_3.

ABSTRACTS FROM FRENCH JOURNALS.

Translated for the American Journal of Pharmacy.

Practical Method of Emulsionizing Vaselin.—M. V. Krebs, a Brussels pharmacist, advises the use of ol. ricini as an emulsifying agent in ointments composed of vaselin and an aqueous preparation. Two drops of the oil should be used for each gramme of the liquid to be mixed, this being sufficient to produce a perfectly homogeneous product. The only disadvantage of the use of the vaselins being thus overcome, their employment may become largely generalized, especially in the making of ointments with the iodide of potassium, whose tendency to decomposition is soon manifested with other fat substances.—*Jour. de pharmacol; Jour. de ph. et de ch.*, Oct. 1.

Emulsion of Balsam of Tolu.—A compound preparation as follows is proposed by M. P. Vigier: Balsam of tolu, 5 gm.; gum arabic (pulv.), 10 gm.; orange-flower water, 10 gm.; syrup of laurocerasus, 30 gm.; water, 100 gm. The balsam is first melted with 10 gm. of 80 per cent. of alcohol.—*Soc. de phar. de Paris*, July 3.

Preparations of Creasote.—Dr. Bouchard uses the following formulæ: Creasote, 10 gm.; almond soap, pulv., 25 gm.; make 100 pills; dose, 1 every 2 hours daily until 8 or ten have been taken. In giving creasote in larger doses, the following formula is used: Creasote, 50 gm.; cod-liver oil q. s. to make 1 liter. Pour the oil gradually on to the creasote while stirring. A tablespoonful contains 75 cgm. of creasote, of which 1 or 2 may be given morning and night. —*Jour. de méd. de Paris; J. de ph. et de ch.*, Sept. 15.

Phenolated Celluloids and Pyroxylin Varnishes.—M. Desesquelle calls attention to the fact that a variety of phenolated celluloids may be prepared from gun-cotton, and that these may be made useful for surgical dressings and for many laboratory purposes. A clear, hard and strongly adhesive varnish is made by soaking pyroxylin in camphorated phenol, while stirring, and spreading it on a plane surface until the camphor evaporates.—*Répert. de phar.*, Aug.

DITHIOSALICYLATE OF SODA.—Dr. Liederborn claims that this salt may advantageously replace the salicylate of soda in the treatment of acute articular rheumatism. There are two isomeric dithiosalicylic acids and two of its salts of soda; the writer recommends salt II, which is the result of the combination of two atoms of sulphur with two molecules of salicylate of soda. It appears as a slightly gray, hygroscopic powder, soluble in water. Certain bacilli are destroyed by it more easily than by the salicylate of soda. The dose is 20 cgm. morning and night; it may be given oftener in severe cases. Nausea, ringing in the ears and transpirations occur when the dose is raised to 80 cgm. It is more energetic, in weaker doses, than is the salicylate of soda and is easily borne by the stomach. The urine gives no coloration with the perchloride of iron.—*J. de phar. d'Als-Lorr.; Répert. de phar.*, Sept. 10.

CRYSTALLIZED PHOSPHO-CITRATE OF IRON.—At a recent meeting of the *Congrès de Thérapeutique* in Paris, M. Lecerf described this salt as a greenish-white crystalline powder, soluble in cold water, very soluble in warm water, and insoluble in alcohol. It oxidizes in the air, taking on a brown color which gradually deepens. In making it, a solution of ferrous sulphate is precipitated by an excess of ammonia phosphate; the precipitate, carefully washed, is allowed to macerate for 5 days at a temperature of 104° in a concentrated solution of citrate of ammonia. This solution is decanted repeatedly until it becomes nearly colorless and the precipitate has become white. The latter is then rapidly washed with distilled water, and afterward with alcohol, and is dried under protection from the air.

OBSERVATIONS UPON COD-LIVER OIL.—M. Unger gives (*Jour. de Phar. d'Anvers*) the following conclusions, drawn from recent experiments: 1. In cod-liver oil the phosphorus and the iron contained in it are combined with albumen. 2. In the good qualities, the albuminoid bodies have undergone no alteration, whilst in the yellow and the brown qualities they gradually decompose. 3. These albuminoids become separated from from the oil when carbonic acid is introduced into a mixture of the oil with water. 4. Pharmacists should require that the amount of free fat acid contained in the oil shall not exceed 4 to 5 per cent., and that the oil in contact with nitric acid of 1·40 shall form an albuminous ring in five hours.—*J. de Ph. d'Anv.; J. de ph. et de ch.*, Sept 1.

ZINC OINTMENT WITH MUCILAGE OF GUM TRAGACANTH.—M. P. Vigier proposes the following as a homogeneous and unalterable preparation: Vaselin, 30 gm.; oxide of zinc, 4 gm.; gum tragacanth, pulv., 2 gm.; distilled water, 10 gm.; tincture of benzoin, 30 drops; powdered soap, 25 cgm. The oxide of zinc should be triturated in a mortar with the vaselin and added to the tragacanth mucilage previviously prepared in another mortar. The soap is then introduced, and, finally, the tincture. It should be kept in closed jars.—*Soc. de Phar. de Paris,* July 3.

NIKOLSKY'S APPLICATION FOR BURNS.—Tanin and alcohol $\bar{\bar{a}}a$, 1 part; ether, 8 parts. Paint the burned portions two or three times daily, first washing with an antiseptic solution and sprinkling lightly with iodoform.—*Ag. des. Ph. Russes; Nouv. rem.*, Aug. 24.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH. G.

The Coloring Principles of Chlorophyll.—By a study of the literature and experimental confirmation of the statements Hansen concluded that chlorophyll was a mixture of two coloring principles which were in combinations with fats or similar substances. The preparation of the coloring principles is best accomplished from grasses, exhausted by boiling water and dried in the dark. The tincture from this dry material is green and in thin layers ruby red; it is concentrated, boiled with an excess of sodium hydrate for three hours, then treated with gaseous CO_2 and evaporated to dryness. Ether takes up the yellow principle and on evaporation leaves it in an impure state as a coral red mass. On extracting this with a mixture of ether and petroleum ether (1 : 1) and evaporating in the dark, the yellow coloring principle is obtained as orange-red needles or rhombic plates, free from nitrogen, insoluble in water, soluble in alcohol, ether, chloroform and benzol with dark yellow color, in carbon bisulphide with a brick-red color; it possesses great coloring power. Exposed to light it changes to a colorless substance giving the cholesterin reaction; with H_2SO_4 it gives a black-blue color.

For obtaining the green coloring matter pure, the alkaline residue left by ether as above is purified by treatment for several days with ether-alcohol (1 : 1) and afterward absolute alcohol; the insoluble portion is dried, covered with ether alcohol (10 : 1) to which phosphoric acid is added, the solution is dehydrated with $CaCl_2$, evaporated and the residue purified by redissolving in ether-alcohol (10 : 1). This pure chlorophyll forms a lustrous, brittle mass, which is insoluble in water, benzol and carbon bisulphide, difficultly soluble in ether, easily in alcohol. It possesses the nature of an acid and contains nitrogen and iron; it dissolves in alkalies, also in acids forming with HCl a blue-green, with H_2SO_4 a pure green solution. The solutions differ from the plant extracts in being less sensitive to exposure to light.

Hansen has also found the yellow coloring principle of flowers to be combined with fats and was able to prepare some in crystalline form after saponification; by a spectoscropic examination the colors obtained were identical with the one from chlorophyll. *Carotin* also appears to be an identical substance.—(D. Naturw. Rdsch.), *Pharm. Centralhalle*, 1889, 540.

Salicyl-sulphonic acid, a test for albumen. If a solution of this acid is added to an albumen solution a white precipitate insoluble in water is obtained; the filtrate tested with other albumen reagents fails to respond, showing the completeness of the precipitation. Direct experiments show that as little as 0·0005 gram albumen in 10 cc. solution can be detected by a faint turbidity. To test its applicability in urine examinations, normal urine and solutions of uric acid, pepton and glucose were tried, but gave negative results. It is applied by taking 10 cc. urine and adding 5 cc. of a 20 per cent. solution of the salicyl-sulphonic acid, the albumen being indicated by an immediate precipitate or turbidity.—Georg Roch, *Pharm. Centralhalle*, 1889, 549.

Benzoic acid, prepared synthetically from toluol and sublimed from a small addition of gum benzoin, has been sold for some time as benzoic acid from benzoin. From its preparation such an acid always contains small quantities of chlorbenzoic acid, which impurity, and hence the source of the acid, can easily be ascertained if a little is ignited with potassium carbonate (free from chloride), extracting the residue with water, and testing for chloride by addition of silver nitrate and nitric acid.—G. and R. Fritz, *Rdsch.*, 1889, 840.

Sulfonal, if heated strongly with reduced iron in a test-tube, develops a garlicky odor, forming at the same time ferrous sulphide; after cooling, to the contents of the test-tube is added an excess of hydrochloric acid, which causes the evolution of hydrogen sulphide, recognizable by the odor or blackening of lead acetate paper. The sample of reduced iron should be tested for sulphide, as it often contains traces of it, for which allowance must be made.—Wefers-Bettink, *Apoth. Ztg.*, 1889, 1043.

Cocaine Tests.—1. By boiling solutions containing cocaine salts decomposition is effected, with production of ecgonine, benzoic acid and methyl alcohol; the formation of benzoic acid is made use of in a test by Lerch and Schärges. If to a solution of cocaine salts one drop of solution of ferric chloride be added a pale yellow coloration results; but by boiling the color changes through orange to an intense red (resembling the color of ferric sulphocyanate). Of other substances giving the same reaction benzoic acid and benzoyl-ecgonine alone need be considered. The presence of the former is not likely, but may be detected by its difficult solution in water; benzoyl-ecgonine melts at 198°C., and is easily soluble in water and alcohol, but *insoluble* in ether. Cocaine differs from benzoyl-ecgonine by melting at 98°C., and its ready solubility in water, alcohol and *ether.—Schwz. Wochensch. f. Pharm.*, 1889, 293.

2. A few drops of a cocaine solution with 2–3 cc. chlorine water and 2–3 drops of a 5 per cent. palladium chloride solution, give a fine red precipitate, slowly decomposed by water, insoluble in alcohol and ether, but soluble in a solution of sodium thiosulphate. Analogous tests with *seventy* other alkaloids gave, in many cases, variously colored solutions without precipitates or, in other cases, dirty white or pale-red precipitates. The test is so delicate as to detect traces of cocaine salts, in which case the precipitation occurs only after several minutes, and is facilitated by gentle agitation.—Dr. Greittherr, *Pharm. Ztg.*, 1889, 617.

Synthetic carbolic acid is now manufactured for chemical and medicinal use by the "Badische Anilin- und Sodafabrik." It melts at 41–42° C. (the best commercial *pure* acid melts at 39·5°, the general melting-point being 35–37°) and boils at 178°C. (181° if the thermometer is completely immersed in the vapor). It is colorless, forms with water an absolutely clear solution and differs most notably from the coal-tar acid by the purity of its odor, which is rather faint;

a 5 per cent. aqueous solution is hardly recognizable by the odor. —*Pharm. Centrathalle*, 1889, 535.

Somnal, a new hypnotic, is made by union of chloral, alcohol and urethane, has the formula $C_7H_{12}Cl_3O_3N$, differing in formula from chloral-urethane by containing C_2H_4 additional. It melts at 42° and does not react with silver nitrate and is not acted upon by acids. It is administered according to the following prescription: Somnal 10·0, distilled water 45·0, solution of licorice or raspberry syrup 20·0, in tablespoonful doses (containing 2 grams). One-half hour after its administration a sound sleep lasting from six to eight hours is produced, without the objectionable after-effects of chloral hydrate or urethane.—*Pharm. Ztg.*, 1889, 611.

Adulterations of beeswax with paraffin, ceresin or ozokerite can be easily determined by subjecting the sample to the influence of heat. In a small porcelain capsule of about 5 cm. diameter and 1 to 2 cm. depth, two grams of the wax, previously cut into shavings and dried by exposure to air, are placed and heated over a *small* flame; when vapors are evolved a beaker of same diameter as capsule and of ½ to ⅔ liter capacity is held over the capsule and completely filled with the vapor, when it is corked and set aside for condensation; a second beaker is filled in the same manner and then the flame is removed. The condensation of the vapor requires about one hour and when completed the deposit of one beaker is dissolved in 3 cc. chloroform and poured into the second beaker, rinsing the first beaker with a small additional quantity of chloroform. With the chloroform solution of the sublimate the following tests are made: 1. One to one and a half cc. are evaporated in a test-tube and, after adding 4 cc. solution of sodium hydrate, heated to the boiling point; after cooling, the paraffin will float upon the colorless lye. 2. Several drops are allowed to evaporate spontaneously upon an object glass and the residue examined microscopically; paraffin has the appearance of raised stars with curved or serpent-like rays. In this distillation the first portion of the vapor always consists of the paraffin, pure beeswax only producing volatile matter on heating to 300–320°C.; the sublimate from beeswax is always colored, the chloroform solution being decidedly colored, the soda lye is colored and also turbid; under the microscope the chloroform residue presents a wavy appearance without the stars. For a quantitative determination the results are only approximate, instead of 25 per cent. there were obtained in three determinations 22·38, 23 and 23·70 per cent.—H. Hager, *Pharm. Centralhalle*, 1889, 565.

Oxygen may be obtained perfectly pure, and without the aid of heat, by dissolving 58 grams ferricyanide of potassium in as little water as possible and mixing with 100 cc. of a 3 per cent. hydrogen peroxide solution; through a funnel-tube solution of potassium hydrate is added, when a steady evolution of oxygen occurs, ceasing so soon as a neutral solution is obtained, but capable of being revived by the addition of more KOH as long as ferricyanide and hydrogen peroxide are present in the generator. From the above quantities two liters of pure oxygen are obtainable; being generated in alkaline solution, chlorine and carbon dioxide cannot contaminate it. The solution in the genertor contains only ferrocyanide of potassium; the reaction is: $C_6Fe_2(CN)_{12} + 2KOH + H_2O_2 = 2K_4Fe(CN)_6 + 2H_2O + O_2$.—Dr. Georg Kassner, *Chem. Ztg.*, 1889, 1302 and 1338.

Another method for obtaining a steady current of *oxygen* is to place in a Kipp's generator chlorinated lime which has been compressed into cubical or other form, and an acidified (HCl or HNO_3) solution of hydrogen peroxide. $CaOCl_2+H_2O_2=CaCl_2+H_2O+O_2$. The acid is necessary to dissolve the impurities in the chlorinated lime. From one liter 2·88 per cent. H_2O_2, 300 gm. bleaching powder, and 57 cc. HCl of sp. gr. 1·17 were obtained 18·5 liters of oxygen, almost the theoretical yield; the oxygen may contain carbon dioxide and small quantities of chlorine, which may be removed by passing the gas through a wash bottle filled with potassium hydrate solution.—J. Volhard (*Liebig's Ann.*), *Pharm. Ztg.*, 1889, 617.

Color Reactions of Phenols.—The various colors obtained with phenols by use of a mixture of sulphuric and nitric acids, Paul Gutzkow attributes to the formation, first, of nitrous acid from the nitric acid and the behavior of nitrous acid towards the phenols. From a careful series of experiments he finds that, starting with nitrous acid, mere traces are sufficient for the production of characteristic colors. The method giving best results was to place in a watch crystal set upon a white background 10–15 drops of strong sulphuric acid, adding a small fragment of the solid phenol, or one drop of the solution, and, after waiting a few moments to allow the acid to cool, from a partly filled bottle of amyl nitrite, allowing the vapor to flow over the sulphuric acid for fifteen seconds; by gentle agitation the colors are developed in a short time.

Carbolic Acid yields, after an evanescent brown-red coloration, a deep blue-green solution, on standing for a time, or more quickly upon heating, changing to a pure blue. By the addition of an equal volume of water a blue or violet-red is obtained; if a portion of this diluted solution is agitated with ether, the latter will be colored yellow, and on evaporation and dissolving the residue in alcohol the addition of a single drop of an alkaline hydrate solution will give a blue color. The blue color may also be produced by pouring the diluted solution into an alkaline hydrate solution. Working carefully one drop of a solution (1 : 1000) gives a decided color.

Thymol gives about the same colors, with these differences: The blue color is more brilliant and on dilution the coloring matter separates in flakes; by agitation with ether the color is completely extracted, coloring the ether a bluish-red.

Resorcin forms a deep blue solution, on addition of water a red-brown precipitate; agitated with ether the latter is colored yellow, leaving upon evaporation a red-brown residue in reflected light possessing a green metallic lustre; this residue, dissolved in alcohol, on addition of an alkaline hydrate, forms a violet solution with a beautiful brick-red fluorescence. If the original test be diluted and poured into an excess of alkali, the violet solution and red fluorescence can also be produced, and by agitation with ether-alcohol (1 : 1) the fluorescent principle will be found in the ethereal solution, while the aqueous solution will be of a pure blue color. This last test slightly modified serves as a delicate test for

Nitric or Nitrous Acid.—To the 10–15 drops of strong sulphuric one drop of the solution containing either of the above acids is added (if an insoluble salt is to be tested it must be rubbed up with a little water and one drop of the mixture taken), and, if possible, upon same spot where the drop was placed a few crystals of resorcin are dropped; if the quantity of the nitrate or nitrite was very small, instead of a blue, a brown-red color may be produced. The mixture is after a few minutes diluted with 2 cc. water and, after cooling, poured into an excess of sodium hydrate solution (if a precipitate of sulphate is obtained this must be redissolved by addition of water); again allowing to cool, the solution is gently agitated with ether-alcohol, when the brick-red fluorescence will be found in the ethereal layer. This test succeeds with one drop of a solution of sodium nitrate (1 : 20,000) or with potassium nitrite (1 : 100,000).—*Pharm. Ztg.*, 1889, 560.

SOLUBILITY OF SUGAR IN WATER.[1]

By L. Périer.

Every specimen of crystallized sugar has its own specific coefficient of solubility, but with all specimens, at a given temperature, the solution of each additional gram in 100 cc. increases the specific gravity by a constant amount for all concentrations between 1 per cent. and 40 per cent. Above 45 per cent. the increase is somewhat less regular, the difference between two consecutive terms gradually becoming smaller. It is, however, easy to construct tables from 1 per cent. to 40 per cent., and from 55 to 100, by taking in each series terms which are not far removed from one another.

The strength of the solution can be calculated from the specific gravity and *vice versâ*, and the result is accurate to the third decimal place. The calculation is based on the specific gravity of a 10 per cent. or 50 per cent. solution. If S_{10} is the specific gravity of a 10 per cent. solution, W the percentage strength of the solution in question, and S_x the required specific gravity,

$$\frac{S_{10}-1}{10} \times W = Sx - 1.$$

The reverse operation gives the percentage strength from the specific gravity.

When sugar is rapidly dissolved, especially with sugar-candy, there is a notable development of heat, which cannot be attributed to the formation of hydrates, and is probably due to internal friction.

Glucose behaves in the same way as saccharose, and hence the specific gravity may be used with advantage for determining the strength of its solutions.

PHYSIOLOGY OF TANNIN.[2]

By G. Kraus.

The formation of tannin in leaves depends on the presence of light and carbonic anhydride: the outer leaves of a plant exposed to direct sunlight will contain far more tannin than the inner leaves. Leaves which are not green are not capable of producing tannin. It must not, however, be assumed that tannin is a product of assimilation of the chlorophyll-grains, inasmuch as there are innumerable plants which assimilate carbonic anhydride without ever producing tannin; and oak, willow, and alder leaves assimilate in dull weather without the amount of tannin being increased. The tannin produced in the leaves passes into the branches and roots, and there is no experimental evidence to show that the tannin which has once passed into the rhizome undergoes further change; there is rather an increase in the amount of tannin in the rhizome through a production in the dark.

---

[1] *Compt. rend.*, cviii, 1202—1204; from *Jour. Chem. Soc.*, 1889, p. 846.

[2] *Bied. Centr.*, xviii, 330; reprinted from *Jour. Chem. Soc.*, Sept., 1889, p. 917.

With regard to the use of tannin to leaves, the author is inclined to view it as a protecting agent either to prevent the plant from being eaten or to prevent rotting, etc.

Falling leaves contain as much tannin as they did during their best time of growth, indicating that the leaf tannin is of no value to the plant.

During germination in the dark of seeds containing tannin (such as the seeds of oak and horse-chestnuts) there is no diminution, but an increase in the amount of tannin.

There is not yet sufficient evidence to show whether tannin is produced from non-nitrogenous substances, or whether it is formed in the conversion of nitrogenous compounds into albuminoïds. It seems probable that aromatic compounds may be formed in the production of albumin, some of which are used in the building up of albumin molecules, whilst others yield tannin.

COLLOÏDAL CELLULOSE.[1]

By C. E. Guignet.

Filter-paper previously treated with hydrochloric and hydrofluoric acids, or carded cotton of the finest quality, is carefully dried and immersed in sulphuric acid of 50° B., care being taken to avoid a rise of temperature. The cellulose forms a transparent, gelatinous mass, which is not affected by contact with a large excess of acid, but is rapidly converted into dextrin at 100°. When the acid has been completely removed by washing, the colloïdal cellulose dissolves in pure water. In order to ensure complete removal of the acid, it is advisable to finish the washing with alcohol, and it is then dried at the lowest possible temperature.

Colloïdal cellulose forms with water a slightly milky solution, which is readily filtered, deposits no precipitate even after several hours, and is not affected by boiling. It has an orange-yellow color, and is slightly dextrogyrate. Like all colloïds it is precipitated from solution by very small quantities of sulphuric or nitric acid, sodium chloride or sulphate, lead acetate, etc. Alcohol in sufficient quantity produces the same result. Colloïdal cellulose does not reduce Fehling's solution, gives no coloration with iodine, and differs from the achrodextrins in being precipitated by small quantities of salts. If a solution is dried on marble which has been rubbed with vaseline and well polished, it forms brilliant, semi-transparent pellicules, which swell up slightly in water and then dissolve. If immersed in sulphuric acid of 60° for a short time, or in acid of 55° for a longer time, it becomes insoluble in water, and at the same time a small quantity of dextrin is formed. When treated with nitric acid it forms nitrocellulose in the same way as ordinary cellulose, and becomes slightly less transparent.

---

[1] *Compt. rend.*, cviii, 1258—1259; reprinted from *Jour. Chem. Soc.*, 1889, p. 847.

Thin parchment-paper, which has probably been prepared with a somewhat weak acid, yields colloïdal cellulose to boiling water, but thicker paper, which has been treated with stronger acid, is insoluble. Parchment-paper may, in fact, be regarded as a cellular tissue, the pores of which have been filled up with colloïdal cellulose.

THE CHEMISTRY OF SALIVA.[1]

By Dr. G. Sticker.

The author has published in the *Deutschen Medizinal-Zeitung* a long and highly interesting communication upon saliva, and the portions more important to pharmacy are here reproduced in a condensed form.

Human saliva is colorless or presents a somewhat bluish tinge and has a sweetish or saline taste. The specific gravity varies between 1·002 and 1·008, but under a purely vegetable diet this is lowered. In the evening and after the different meals the saliva is heavier than in the morning or when fasting; in the former case too it presents an alkaline reaction, but in the latter it reacts faintly acid. With an increased consumption of amylaceous food the alkali in the saliva increases, but with a pure flesh diet it decreases. Whilst in the horse the quantity of saliva secreted in twenty-four hours will amount to four to six kilograms, it amounts in grown men to from 500 to 1,500 grams. In the flesh-eating dog the quantity is still much smaller, since flesh-eaters require less saliva for their food, which is rich in water; the most being required by granivorous animals for their relatively dry food.

---

[1] From the *Apotheker-Zeitung*, reprinted from *Phar. Jour. and Trans.*, Aug. 3, 1889, p. 88.

In respect to diastatic power the saliva of omnivorous man exceeds that of any other creature. In the first two months of an infant's life the diastatic power of the saliva is almost without exception wanting. Occasionally it is present in the saliva of the three months' child, but the more intense action does not become manifest until towards the end of the first year. The toothless child should therefore obtain only liquid nourishment and have flesh given to it only after the appearance of the incisors and canine teeth. The body temperature of 38° to 39° C. is the most favorable for the saccharifying action of human saliva.

Ptyalin is paralyzed by alcohol and the diastatic action of the saliva is also stopped by large quantities of alkalies or acids. One per cent. solution of carbolic acid in contact with saliva deprives it after a time of the power to decompose starch. A 0·2 per cent. solution of salicylic acid diminishes the salivary fermentation, and a 1 per cent. solution stops it entirely. But it is remarkable that this action is not exercised by the sodium salt of salicylic acid, notwithstanding that it possesses antizymotic properties. A similar action, but to a greater extent, is however shown by salicylic acid upon emulsin, myrosin, and synaptase, whilst pepsin and trypsin can be protected from putrefaction by the addition of salicylic acid without their specific action being injured in the least. Borax does not kill diastase, whilst quinine and arsenious acid paralyze the ferment only in very large doses. Quinine, strychnine, morphine and curare in small quantities promote the fermentative action of the salivary liquid, in accordance with the known pharmacological axiom that small doses frequently excite while large doses paralyze. A similar behavior is shown by the pancreas-ptyalin. Sodium chloride solution up to a strength of 3·85 per cent. promotes the fermentative action of saliva, a higher percentage diminishes it. The same action is shown by sodium sulphate and ammonium chloride, whilst the fermentative action is depressed by ammonium nitrate and potassium chloride. At a temperature of 38° to 40° C. salicin is converted by the salivary ferment into sugar and saligenin, but it is not so split up by diastase. Tannin, also, is decomposed into gallic acid and sugar by the diastatic ferment of the saliva, and animal glycogen is converted by it into γ-dextrin and ptyalase.

In respect to the secretion of saliva it has been found that a temporary diminution of human saliva may be effected artificially by paralyzing the nerves of secretion by means of atropine, daturine, cicutine, iodethylstrychnine and nicotine in large doses. The agents having a reflex action upon the salivary function, as, for instance, calamus root, absinth, ginger and black and cayenne peppers, stimulate the secretion, but where these fail, use is made of digitalin, nicotine, aconitine, physostigmine or pilocarpine. Potassium iodide has also proved effective in stimulating the secretion. Psychic moments, such as the perception of savory food, or lascivious thoughts, will induce in healthy men an increased flow of saliva. A salivary flow is also caused by iodine salts, iodine and allied halogens, gold chloride and nitrate, and copper and lead salts; also by some alkaloids, as nicotine, physostigmine, and pilocarpine, muscarine, as well as by digitalin, sphacelinic acid and cornutin. It has also been observed in cases of carbolic acid poisoning.

Should the salivary glands become affected in consequence of fever, the saliva will occasionally contain as much as 5 per cent. of albumen, and also in cases of iodism and mercurialism. When there is blood decomposition, as, for instance, the dissolving of the blood corpuscles by anseniurretted hydrogen, frequently the saliva will be sanguineous. In cases of suppression of urine the occurrence of urea in the saliva has been observed. In uraemia ammonium carbonate has been ascertained to be a constituent, and in mercurial salivation valerianic acid appears in small quantities.

The passage of arsenical medicines into the saliva is frequently observed, while iodine and bromine especially find their way into it very rapidly. The interval between the taking of 0·2 gram of potassium iodide fasting and the first detection of an iodine reaction in the saliva varies between nine and twenty-two minutes, and in the urine between nine and nineteen minutes. The metals combined with the halogens iodine and bromine, such as potassium, sodium or lithium, cannot be detected simultaneously in the saliva. Mercury passes into the saliva only when the system is completely saturated with that metal. Saliva containing iodine or bromine converts starch equally rapidly into dextrin and maltose as when normal; also calomel saliva is not injured as to its saccharifying power. Copaiba balsam can be recognized in the saliva of persons who take it almost immediately. According to the investigations of L'Héritier the saliva of a healthy person contains 98·65 per cent. of water, 1·26 per cent. of organic matter and 0·09 per cent. of salts.

From antiquity a high therapeutic and toxic action has been ascribed to saliva, and emperors and kings have worked "miracles" by means of their spittle. Recently Brera has mixed saliva, on account of its easy absorption with ointments and other external applications. He reports that in chlorosis he has obtained good results by the admixture of saliva with opium, and he also speaks favorably of mixture of saliva with scilla, digitalis, aconite and sublimate. Dr. Sticker further seems to have stated in his paper that it is the custom of the German *apotheker*, when preparing mercurial ointment, to spit into the mortar, but this is distinctly contested by the editor of the periodical from which the foregoing abstract is taken.

THE CHEMICAL CHANGES IN THE GASTRIC JUICE.[1]

By Dr. Bourget.

Dr. Bourget, in this paper, after criticising the theories of Bouchard and Glenard, proceeds to give the result of his experiments with regard to the action of certain substances upon the contents of the stomach. Salol only undergoes change after passing the pylorus and coming in contact with an alkali. Dr. Bourget found that on taking 2 per cent. HCl with a meal salol was discovered in the urine $1\frac{1}{4}$ to $1\frac{1}{2}$ hours afterwards, while if he partook of fruit and vegetables the time which elapsed was reduced to from a quarter to half an hour. He argues from this that conclusions drawn from the use of salol are subject to great error. Dr. Bourget objects to the common plan of prescribing pepsin in disease of the stomach. He says that in sixty-three cases after analysis of the contents of the stomach sufficient pepsin was present for the purposes of digestion. In fifteen cases of carcinoma pepsin was never deficient in quantity. This was also the case in forty cases of chronic and subacute gastritis. In sixteen cases of carcinoma Dr. Bourget never found full HCl in the stomach. In seven cases of ulcer of the stomach the quantity of HCl was great, but no pyrosis was present. In thirty-six cases of gastritis under observation HCl was absent, only to return with return of health. When HCl is absent lactic acid is present. In a case of chronic gastritis Dr. Bourget found 1·60 per cent of lactic acid and no HCl. The lactic acid being the product of micro-organisms in the stomach, the process of their development is checked by HCl. Bicarbonate of soda is useful, but brings no permanent benefit. Instead of using these drugs, he says, "Prevent the formation of lactic acid by the administration of HCl." From these observations he concludes (1) that pepsin is nearly always useless in the treatment of these diseases, (2) that pyrosis ought to be combated not by alkalies, but by HCl, (3) and that alkalies should never be given until the process of digestion is completed.

---

[1] *Revue médicale de la Suisse Romande;* from the *Medical Chronicle*, October, 1889, page 42.

CUPREÏNE.[1]

By A. C. Oudemans, Jr.

The pure base was prepared as follows: The commercial basic sulphate was converted into the neutral hydrochloride by heating it with 10 times its weight of water, and adding hydrochloric acid until a clear solution was obtained. To this was added the calculated quantity of barium chloride required to precipitate the sulphuric acid, the solution being continually shaken; the precipitate was allowed to settle, the liquid filtered through animal charcoal, and, when cold, poured little by little into a dilute solution of ammonia, which was shaken continually; finally, the precipitate thus obtained was washed rapidly with cold water. If any had become colored, it was digested with 70 per cent. alcohol, and the residue dissolved in alcohol, and precipitated by the cautious addition of water; the alkaloïd was thus obtained perfectly white and pure. The formula is $3(C_{19}H_{22}N_2O_2)+H_2O$. When anhydrous, it melts at 197°; its specific rotatory power is $[\alpha]_D=175{\cdot}4°$ in dilute aqueous or alcoholic solution.

Various salts were prepared, and their solubility in water and their specific rotatory power determined. The solubility was determined at temperatures varying between 15° and 17°, and is given below in terms of the anhydrous salt. The specific rotatory power was determined at 17° for aqueous (and in some cases also for alcoholic) solutions of varying concentration; it was found that its value increased with the dilution of the solutions, and was generally somewhat higher for alcoholic than for aqueous solutions of the same strength. The values given below are those obtained with the most dilute solutions used. They are calculated from the formula $[\alpha]_D = Vx/1p$. In the case of cupreïne dihydrochloride, the specific rotatory power was found to diminish with the addition of free hydrochloric acid to the solution.

---

[1] *Rec. Trav. Chim.*, viii, 147–172; reprinted from *Jour. Chem. Soc.*, Oct., 1889, p. 1018. Compare also papers in Amer. Jour. Phar., 1884, pp. 517 and 575; 1885, p. 249, and 1886, p. 132.

FORMULA.	100 parts of water dissolve	Specific rotatory power		
		Concentration $=\frac{p}{V}$.	Of the salt.	Of the base.
$3(C_{19}H_{22}N_2O_2),H_2O$	....	0·0069	....	—175·4°
$C_{19}H_{22}N_2O_2,HCl+,H_2O$	$1·7_8$	0·0056	—157·1°	—184·7
$C_{19}H_{22}N_2O_2,2HCl$ " " $+H_2O$	17·1	0·0109 0·0119	—211·0	—283·8
$C_{19}H_{22}N_2O_2,HBr+H_2O$	0.82	0·0049	—145·8	—192·7
$C_{19}H_{22}N_2O_2,2HBr$ " " $+2H_2O$	7·99	0·0156	—189·0	—287·7
$C_{19}H_{22}N_2O_2,HI$	0.94	0·0080	—126·3	—178·4
$C_{19}H_{22}N_2O_2,2HI+H_2O$ " " $+2H_2O$	6·67	0·0150	—151·2	—283·2
$C_{19}H_{22}N_2O_2,HNO_3+,2H_2O$	1·06	0·0113	—138·4	—182 5
$C_{19}H_{22}N_2O_2,2HNO_3+H_2O$	8·20	0·0128	—179·4	—289·1
$C_{19}H_{22}N_2O_2,HClO_3$	2·08	0·0103	—144·9	—184·4
$2(C_{19}H_2N_{22}O_2),H_2SO_4+6H_2O$	0·12 0·48 (at 100°)	....	....	
$C_{19}H_{22}N_2O_2,H_2SO_4+2H_2O$	1·36	0·0095	—202·4	—289·9
$C_{19}H_{22}N_2O_2,CH_2O_2$	0·91	0·0048	—163·8	—183·0
$C_{19}H_{22}N_2O_2,C_2H_4O_2+2H_2O$	1·18 5·88 (at 100°)	....	....	
$2(C_{19}H_{22}N_2O_2),C_2H_2O_4+2H_2O$	0·25	....	....	
$2(C_{19}H_{22}N_2O_2),C_4H_6O_6+2H_2O$	0·17	....	....	

It was also found that the calculated specific rotatory power of the base is much greater in the normal than in the basic salts. It has nearly constant values of 285·4° and 185·4° respectively. The salts, with 2 mols. of a monobasic acid, are also more soluble than those with 1 mol.

The table summarizes the data regarding the salts of cupreïne; many of these salts have already been prepared by Hesse, or by Paul and Cownley.

The following salts were also prepared, but as they are not well characterized, nothing but an analysis of them was attempted, and not even this in all cases:

$C_{19}H_{22}N_2O_2,2HClO_3+xH_2O$; $C_{19}H_{22}N_2O_2,HClO_4+1\frac{1}{2}H_2O$;
$C_{19}H_{22}N_2O_2,2HClO_4+2H_2O$; $C_{19}H_{22}N_2O_2,2H_2SO_4+3H_2O$;
$C_{19}H_{22}N_2O_2,2CH_2O_2+xH_2O$; $C_{19}H_{22}N_2O_2,2C_2H_4O_2+xH_2O$;
$C_{19}H_{22}N_2O_2,2C_2H_2O_4+xHO$; $C_{19}H_{22}N_2O_2,C_4H_6O_6+xH_2O$;
$C_{19}H_{22}N_2O_2,2C_4H_6O_6+H_2O$; $C_{19}H_{22}N_2O_2,H_2PtCl_6+H_2O$.

PURE AND ADULTERATED OIL OF CINNAMON CASSIA.

Among the adulterations of commercial oil of Chinese cinnamon, that with rosin or a similar resin has been repeatedly referred to in former years. Much of this oil was shipped with a certificate of genuineness or purity signed by Niedhardt, chemist of the Medical Hall at Hongkong, who after exposure attempted in various ways to maintain the correctness of his assertions. The absurdity of these claims have been fully shown in the Report on Essential Oils by Schimmel & Co., of Leipzig, for October, who, in addition, give the following information on pure and adulterated cassia oil:

The owners of the brand of ying chong, which has been found to be genuine, write us from Macao, that they have suspended shipments for some time, inasmuch as the adulterated oils, which are being offered at a low price, had made it impossible for them to compete. They moreover remark, very much to the point, that the owners of the adulterated brands: yan loong, cheong loong and luen tai, had evinced the utmost disinclination to and avoided having their oils inspected and placed under supervision at Macao. It results from authentic reports that the oil is brought from the province Kwangtung to Macao, where it is put up. Hence there is probably some reason for supposing that the owners of the above brands, who, at the time, contracted sales down to as low a price as 2s. 1d. per pound, effected the adulteration at Macao at the ratio of the prices obtained. But, no matter where the falsifiers may be located, it will now be the task of the Hongkong firms to stop their nefarious practices and, as it is surely preferable, in commerce, to be liberal in the matter of price rather than to buy resin in lieu of cassia oil, the matter will, after some opposition on the part of the falsifiers, progress in the right groove of its own accord.

We now subjoin a table showing the pure cassia oils examined by us:—

Origin.	Color.	Specific gravity at 20° C.	Rectification-Residue.
1. Cassia Oil our own distillation, from cassia chips (age: 4 months).....................	pale yellow	1,035	5.4 per cent. liquid
2. Cassia Oil our own distillation, from cassia buds (age: 4 months).....................	brownish	1,026	4.4 " " "
3. Cassia Oil brand ayong (age: 60 to 80 years)............	"	1,062	6 " " "
4. Cassia Oil brand ayong (age: 24 years)....................	yellow	1,060	8 " " "
5. Cassia Oil brand ayong (age: 22 years)....................	"	1,060	7 " " "
6. Cassia Oil brand hop lee a. chip (very old)....................	"	1,059	7 " " "
7. Cassia Oil brand tac foong (age: unknown)..................	pale yellow	1,060	5.5 " " "
Cassia Oil brand ying chong (age: unknown)...............	yellow	1,055	7 " " "

whereas the notorious adulterated cassia oils gave the following results:—

Origin.	Color.	Specific gravity at 20° C.	Rectification-Residue.
8. Yan loong (Ist lot).........	reddish brown	1,057	26 per cent., solid
9. " " (IId ").........	"	1,059	23 " " "
10. Cheong loong (Ist ").........	"	1,056	24 " " "
11. " " (IId ").........	"	1,051	26 " " "
12. " " (IIId ").........	dark brown	1,061	33 " " "
13. Luen tai	"	1,060	38 " " "

The oils 12 and 13 taken from the most recent arrivals were of a syrup-like consistence. Everybody will agree that it is now high time to stop such a nuisance.

After such results it will become of first necessity, to submit to a thorough modification all the statements contained in literature about the resinification of cassia oil which, in closed tins, amounts to nothing. The formation of a solid resin as observed in the above named adulterated brands, is entirely out of the question.

The demands to be met by a good, merchantable cassia oil, result ipso facto from the analyses. We collect them, briefly, in the following synopsis:—

1. Cassia Oil should have, at 15° C. a specific gravity of 1,050 to 1,070.

2. On distilling, about 90 per cent. pure cassia oil should pass over. The residue must not become solid after cooling and take the character of a brittle rosin, but must remain, at least, semi-fluid. It may amount to from 6 to 7 per cent., but in no case to more than 10 per cent.

No practical value for the detection of resin can be attached to testing the solubility of the oil in more or less diluted spirit, as is proven by the examination of oils which had been purposely mixed with resin and petroleum.

As a matter of course it is possible that adulteration with fatty oil will again, occasionally, be resorted to, and that the fluid residue obtained by distilling, will amount to more than 10 per cent. Any such oil must of course be rejected by the Hongkong and Macao firms. We shall, henceforth, exercise a strict control over the oils coming into the market and keep an eye on the different brands, in order to be able, when occasion may offer, to proceed also against other means of adulteration, whilst on the other hand we shall take pleasure in publishing from time to time those brands which excel in quality.

For examining cassia oil weigh out about 50 gm. of it into a small fraction-retort, connect it with the cooling-tube and place the thermometer, by means of a perforated cork-stopper, about 5 to 10 centimeters above the fluid. The retort may not be more than half full. At first some water escapes, with a cracking noise, from the fluid. The oil commences, usually, to boil at about 200°. The thermometer rises quickly to 240°. The principal quantity of the oil distils over between 240° and 260°. At last, white vapors develop in the retort, the thermometer rising, at the same time, to 280° or 290°. When this has taken place, the distillation is to be interrupted; the residue is allowed to cool in the retort and weighed with it. If the residue becomes hard and solid after cooling, the oil is to be considered adulterated and rejected. Genuine, non-adulterated oil also leaves a residue (up to about 10 per cent.). But it never becomes solid and remains in a semi-fluid state, also after having cooled off completely. The fraction-retort used must be properly cleaned with hot spirit.

With regard to the control to be exercised, the proposal made by a Hongkong firm, appears to us to be very practical. Its purport is to appoint, in conjunction with the other firms mostly interested in the export, a chemist entrusted with the examination of the oil in accordance with our system. The intention of testing each tin, appears to be going slightly too far, and probably it would be sufficient to test one tin out of each case.

We think that, by what precedes, we have cleared up this matter so far as to preclude the possibility of any unprejudiced person, remaining in doubt about it. But with a view to offering an opportunity to the numerous firms at Hongkong and Macao,—who in the existing state of matters have, no doubt, but rarely obtained any personal insight into shipments of cassia oil,—to convince themselves in what unheard-of manner dealers in and consumers of cassia oil have been deceived, we have sent to the Imperial Consulate for Germany in Hongkong some good sized samples of the above-mentioned pure and adulterated oils (Nos. 1–7, 8, 10 and 12), requesting that authority, after the arrival of the said articles, to invite the parties interested at Hongkong and Macao to inspect them; together with the light hydrocarbons obtained from the adulterated oils, and the resins from Nos. 8, 10 and 12.

It will cause surprise that the oils No. 1 and 2 of the foregoing list, distilled by ourselves, show a materially lower specific gravity than the pure Chinese oils. Probably the reason of this deviation is that, by means of our more perfect distilling apparatus, we are able to remove more efficiently the highest boiling ingredients of the oil, than it is possible for the Chinese to do with their primitive apparatus. However the idea is not excluded that the condition of the raw-material employed may also have to be taken into account.

The demarcation of the value of the mercantile cassia oils, on a scientific basis, will have to take its departure from the ascertained quantity of cinnamic aldehyde contained in it. We have also enquired into the matter and found a process which gives satisfactory results, if handled by a skilled operator.

The following represents the results obtained by us:—

a. Pure oils.—No. 1. 88 9 p. ct. No. 3. 76·0 p. ct. No. 5. 89·4 p. ct. No. 7. 78·4 p. ct.
No. 2. 80·4 " No. 4. 72·9 " No. 6. 76·6 " cinnamic aldehyde.

b. Adulterated oils.—No. 8. 58·0 p. ct. No. 10. 58·7 p. ct. No. 12. 57·8 p. ct. cinnamic
No. 9. 63·2 " No. 11. 52·9 " No. 13. 47·1 " aldehyde.

The amount of cinnamic aldehyde has been found from the percentage of non-aldehydes after separating the cinnamic aldehyde by bisulphite of sodium. This operation requires the observance of different precautionary measures in order to obtain exact results and cannot be executed by persons unfamiliar with chemical practice.

The results show, that every adulteration diminishes the amount of aldehydes. As to the normal amount of the aldehydes in cassia oil, the matter, up to the present, has not been sufficiently investigated. We can only say, that an oil, containing less than 70 per cent. of aldehydes, has to be considered as adulterated and that, probably, an oil with less than 75 per cent. of aldehydes can be looked at as suspicious. Further experiences will clear up this matter shortly.

In earlier years cassia oil was adulterated too, and especially with fixed oils, but pure cassia oil prevailed in trade and the adulteration was carried on in rather moderate limits. Different kinds of old oil examined by us, gave the following results :—

13. Cassia oil brand ayong, age 9 years, 79 p. ct. of cinnamic aldehyde.
14. “ “ “ “ “ unknown, 70 “ “ “ “
15. “ “ “ hemkee, “ “ 73 “ “ “ “

No. 13 left a liquid residue from which we isolated fatty oil to the amount of 10 per cent. This oil would have shown, *before the adulteration,* about 90 per cent. of cinnamic aldehyde.

We are occupied with a thorough investigation of pure cassia oils and have stated that the chief constituents of the non-aldehydes of cassia oil is the acetic ether of cinnamyl, $C_2H_3O_2—C_9H_9$. In submitting the non-aldehydes to a repeated fractional distillation in vacuo, we found the fraction boiling at 135°—145° (at 11 mm. atmospheric pressure) to be entirely the above-named ether. The cinnamic alcohol, obtained by saponification, crystallizes from ether in white solid crystals, boils at 137° (at 11 mm. atmospheric pressure) and shows a somewhat hyacinth-like odor.

Besides this ether—if a conclusion from its boiling point and the alcohol obtained is allowed—the presence of acetic ether of phenylpropyl is very probable.

Terpenes of the constitution $C_{10}H_{16}$ are excluded. The presence of sesquiterpenes or polyterpenes is only presumed and requires further confirmation.

Free cinnamic acid, formed by oxydation of the cinnamic aldehyde, when in contact with the open air, was found in both, the old and the fresh distilled oils, but always in very small proportions.

COCA CULTIVATION IN THE EAST INDES.

The director of the Botanical Gardens at Buitenzorg (Java), in his last report, makes some observations concerning the cultivation of coca leaves in the Dutch East Indies, which go some way to confirm the view that before many years are over a not inconsiderable proportion of our requirements in this article may be supplied by the Java planters, unless indeed the market price of the drug should depreciate to such an extent as to render the culture of the plant absolutely unprofitable. The climate of Buitenzorg, and presumably therefore of a very large portion of Java, is now proved to be excellently suited for the propagation of the plant. A trial plantation of not quite $\frac{1}{2}$ bahoe (=$\frac{7}{8}$ acre) area gave four crops of leaves during the year 1888—viz., in February, April, June, and September, the total weight of dry leaves obtained being fully 360 lbs. It would seem from these data that, given favorable circumstances and intelligent cultivation, an acre of coca plants might be made yield a crop of about 400 lbs. of leaves, which, if properly cured and of fair quality as the drug now goes, ought to realize at least 20*l*. in Europe, and therefore be a far more profitable crop than cinchona is now. Last July the Buitenzorg Gardens were visited by a prominent German cocaine manufacturer, with whom the directors of the gardens had a long interview concerning the best way of growing and curing the drug, and making its cultivation a commercial success. As a result of the interview, two samples of coca leaves were sent from Buitenzorg to Germany for analysis; one of the samples (of about 45 lbs.) consisted of slowly-dried leaves, the other of leaves which had been dried as quickly as possible in the sun and subsequently reduced to a fine powder. The leaves sent to Germany were of the small varieties which, when previously tested, had been found to be of the greatest alkaloidal richness. The slowly-dried sample was found to contain 0·34 per cent. of absolutely pure cocaine alkaloid. The second sample of 60 lbs. of sun-dried and powdered leaves only yielded 0·14 per cent. of absolutely pure cocaine. The latter shipment when received in Europe showed leaves of a bright green color, but without the characteristic smell. The quick-drying system, therefore, appears to exercise an unfavorable influence on the alkaloidal value of the leaf. Another sample of the second variety was sent to Europe through a Batavia shipping house, analyzed by another firm, and gave the same bad results as the first, the sale price being one at which it could not possibly pay cultivators to grow the drug. The conclusion of these trial shipments has been to prove beyond doubt that the mode of gathering and curing the leaves exercises a very decided influence on the percentage of cocaine yielded by them, and that in order to make the cultivation of coca a paying industry, the most scrupulous account must be taken of the variety of leaves grown, the time for gathering and drying the crops, and the mode of packing and shipment. But if these conditions are carefully kept in view, we should say that it ought to pay Java and Ceylon planters to grow coca to a moderate extent, not as a chief crop, but as one of those smaller adjuncts to their staple which, though not yielding riches in themselves, are specially useful in seasons when the receipts from the large crops show a decided falling-off.—*Chemist and Druggist*, Sept. 28, p. 468.

SENNA PODS.

By E. F. Salmon, Pharmaceutical Chemist.

In the *Lancet* of July 27, 1889, appeared a "Note on the Therapeutic Action of Senna Pods," written by Dr. MacFarlane, Examiner in Forensic Medicine, University, Glasgow. My attention was directed to it by a member of the medical profession, who requested me to procure some of the pods, and prepare an active preparation of the same, as had already been done for Dr. Macfarlane by Mr. Borland. This I did, and prepared a fluid extract which has since been prescribed and used with very satisfactory results. As probably other pharmacists will be applied to on the same subject, the following notes may be of interest:—

The active purgative principle of senna is cathartin, which is a combination of cathartic and phosphoric acids with magnesium and calcium bases; this substance may be thrown out of an aqueous solution by alcohol, first adding sufficient to throw down the gum, albumen, etc., and then an excess to precipitate the cathartin.[1] Two comparative experiments showed that the pods are richer in this substance than the leaves, the latter yielding 2 and the former 2½ per cent. when treated as above. In addition to cathartin there is found in the leaves a resinous principle and a volatile oil; these are practically absent in the pods.

---

[1] *Pharmacographia*, p. 219.

The pod or legume consists of the two valves of the carpellary leaf, bearing about half a dozen seeds attached by a capillary funiculus to the marginal placentas; each valve consists of three layers, the outer, epidermis, pierced with stomata and easily pervious to water; next, a central mass of parenchyma traversed by the "veins;" it is in this layer that the cathartin is stored; lastly, a fibrous tissue devoid of active principle.

The advantages claimed by Dr. Macfarlane in the use of the pods over the leaves are the absence of nauseous taste and of tendency to cause griping pains, both of which are associated with the use of the leaves. It was shown in a paper printed in the *Pharmaceutical Journal*, March 18, 1876, by C. L. Diehl, that senna leaves, when previously treated with alcohol and then dried, will give preparations which, while possessing the purgative qualities, are tasteless and do not gripe.

The treatment with alcohol had removed the resinous and odorous principles to which the griping and nauseous taste are due, leaving the cathartin unchanged, it being insoluble in alcohol.

The pods being richer in cathartin, and not containing either resin or oil, render them especially well adapted for use as an efficient aperient, and one not too rapid in action.

Cold water readily dissolves out the cathartin from the pod, which it will not do from the leaf, owing to the impervious nature of its epidermis. Accordingly for the preparation of a fluid extract, cold water will be found the best menstruum. Two macerations of the carefully picked over pods, which should also be torn in pieces, will be found to practically exhaust them. The first maceration should be for twenty-four hours, for the second twelve is sufficient. For one pound of pods, six pints of cold distilled water for the first and about three pints for the second maceration, is a sufficient quantity to use, the liquors when strained off to be evaporated to thirteen fluidounces and the usual four ounces (25 per cent.) of spirit added, and after standing a few hours to be filtered, and, if necessary, made up to sixteen fluidounces with distilled water.

This makes an almost black looking liquid of specific gravity 1040 (average), perfectly tasteless, and of which the adult dose is one-half to two fluidrachms, the smaller dose seldom failing to produce purgation.—*Phar. Jour. and Trans.*, October 12, 1889, p. 281.

BEHAVIOR OF SODIUM THIOSULPHATE WITH ACIDS.[1]

By W. Vaubel.

The author having noticed that by the decomposition of this salt by acids, small quantities of hydrogen sulphide were sometimes formed, has carefully studied its behavior towards acids. With formic, acetic, succinic, citric, hydrobromic, hydriodic, hydrofluoric, nitric, sulphurous, dithionic, phosphoric, and very dilute sulphuric acids, the amount of sulphurous anhydride and sulphur obtained always agrees with that required for the equation $Na_2S_2O_3+2AcOH=2AcONa+H_2O+SO_2+S$. But with stronger sulphuric acid this is not the case. In a series of experiments where 10 mols. of sulphuric acid of various degrees of concentration were employed to 1 mol. of sodium thiosulphate, and the reaction completed in the cold, the sulphurous anhydride evolved varied from 74 per cent. of the theoretical with acid of 20 per cent. to 92 per cent. with acid of 90 per cent., the precipitated sulphur more nearly approached the theoretical quantities. But with 100 per cent. sulphuric acid, the percentage of sulphurous anhydride fell to 45·4 per cent., that of precipitated sulphur to 9·15 per cent., whilst much less than the theoretical quantity of sulphuric acid was neutralized. In the last-named reaction the evolution of hydrogen sulphide was very noticeable. With more dilute acid, it was often detected, but was estimated with the sulphurous anhydride.

When these experiments were repeated with 10 per cent., 20 per cent., and 40 per cent. hydrochloric acid, the sulphurous anhydride varied between 82–88 per cent. of the theoretical, that of precipitated sulphur between 86 and 97 per cent., whilst quantities of sulphuric acid corresponding with 6 to 8·5 per cent. sulphur were always formed.

Geuther showed that when a solution of sodium thiosulphate is treated with silver oxide, silver sulphide is formed, and the author finds that the quantities so formed correspond exactly with those required for the equation $Ag_2O+Na_2S_2O_3=Ag_2S+Na_2SO_4$. Orlowski has shown (*J. Russ. Chem. Soc.*, 1883 [i], 32) that those elements precipitated by hydrogen sulphide in acid solutions are also under like conditions precipitated as sulphides by sodium thiosulphate.

---

[1] *Berichte*, xxii., 1686–1694; reprinted from *Jour. Chem. Soc.*, 1889, p. 943. See also this Journal, page 524.

From these results the author concludes that the decomposition of thiosulphuric acid is not the simple one generally believed, but that the first phase is a decomposition into hydrogen sulphide and sulphuric anhydride, which then further react on each other. The various reactions taking place would then be expressed by the equations: (I) $H_2S_2O_3 = H_2S + SO_3$. (II) $H_2S + SO_3 = SO_2 + S + H_2O$. (III) $2H_2S + SO_2 = 3S + 2H_2O$. (IV) $3H_2S + SO_3 = 4S + 3H_2O$.

SULPHITES AND THIOSULPHATES.[1]

By H. Schwicker.

Sodium potassium sulphite, $NaKSO_3 + 2H_2O$, separates in yellowish crystals, when a concentrated solution of potassium hydrogen sulphite is neutralized with the calculated quantity of sodium carbonate, and evaporated over sulphuric acid. (Compare Röhrig, *J. pr. Chem.* [2], xxxvii, 250.) When heated with ethyl iodide at 140°, it yields a compound $4SO_2Et{\cdot}OK,NaI$, which crystallizes from hot alcohol in colorless needles.

Potassium sodium sulphite, $KNaSO_3 + H_2O$, prepared from sodium hydrogen sulphite and potassium carbonate in like manner, is a yellowish, crystalline compound. When heated with ethyl iodide at 140°, it gives a colorless salt, which has the composition

$$4SO_2Et{\cdot}ONa,KI.$$

The salt $HKNa_2(SO_3)_2 + 4H_2O$, separates in large, well-defined plates, when a solution of equivalent quantities of sodium potassium sulphite and sodium hydrogen sulphite, or a solution of sodium hydrogen sulphite (2 mols.) and potassium carbonate (0·5 mol.) is evaporated. It is moderately stable in the cold, but it is quickly decomposed when heated. It is readily soluble in water, the solution having an acid reaction, and concentrated solutions combine with acetone with development of heat. Compounds of the same composition, and which seem to be identical with the double salt just described, are obtained when a solution containing sodium sulphite and potassium hydrogen sulphite is evaporated, or when a hot solution of either of the sodium potassium sulphites (see above) is saturated with sulphurous anhydride; the solubility in water of all these compounds is approximately the same (69 per cent. at 15°), but in some respects they differ slightly.

---

[1] *Berichte*, xxii, 1728–1737; reprinted from *Jour. Chem. Soc.*, 1889, p. 942.

The compound $HNaK_2(SO_3)_2+3H_2O$ separates in transparent prisms when a concentrated solution of equivalent quantities of sodium potassium sulphite and potassium hydrogen sulphite is evaporated over sulphuric acid; it behaves like the double salts described above.

A compound, $H(NH_4)Na_2(SO_3)_2+4H_2O$, separates in colorless crystals when ammonia is passed into a concentrated solution of sodium hydrogen sulphite, or when a concentrated solution of ammonium hydrogen sulphite is partially saturated with sodium carbonate. Tauber (*Jahresb. Chem. Techn.*, 1888. 444), by the latter method, obtained a salt to which he assigned the formula $2Na_2SO_3,(NH_4)_2S_2O_5+10H_2O$, and, in fact, all the double salts described above may be regarded as pyrosulphites of analogous constitution. It crystallizes in large plates, and is moderately stable at the ordinary temperature, but at 130° it is quickly decomposed with evolution of water, ammonia, and sulphurous anhydride. It is readily (48·5 per cent. at 15°, 42·3 per cent. at 12·4°) soluble in water, and the solution has an acid reaction. It seems to be identical with the double salt described by Marignac (*Jahresb. Chem.*, 1857, 118).

Sodium potassium thiosulphate, $SNa{\cdot}SO_2{\cdot}OK+2H_2O$, is obtained in large, transparent plates, when a freshly prepared, concentrated solution of ammonium pentasulphide is added to a solution of sodium potassium sulphide (see above) until a permanent yellow coloration is produced, the ammonia expelled by boiling, and the filtered solution evaporated on the water-bath. It is very readily (213·7 per cent. at 15°) soluble in water, melts at about 57°, and when heated with ethyl bromide in aqueous solution it yields colorless crystals of potassium ethyl thiosulphate.

Potassium sodium thiosulphate, $SK{\cdot}SO_2{\cdot}ONa+2H_2O$, prepared from potassium sodium sulphite (see above) in like manner, crystallizes in small, colorless plates, melts at about 62°, and is very readily (105·3 per cent. at 15°) soluble in water. When an aqueous solution is heated with ethyl bromide, sodium ethyl thiosulphate is obtained; the last-named compound crystallizes from dilute alcohol in long, transparent needles, which seem to contain 1 mol. H_2O.

Potassium tetrathionate is obtained when either sodium potassium or potassium sodium thiosulphate is treated with iodine; this abnormal behavior is owing to the fact that potassium iodide decomposes sodium tetrathionate with formation of the more stable and more sparingly soluble potassium salt. When iodine is added to a solution of sodium thiosulphate containing a sufficient quantity of potassium iodide, potassium tetrathionate is alone formed.

The compound $KAgS_2O_3+NH_3$ separates in nacreous plates when a solution of either of the sodium potassium thiosulphates, or of potassium thiosulphate, is mixed with an equivalent quantity of an ammoniacal silver nitrate solution. It is very sparingly soluble in water, and silver sulphide quickly separates from the solution, but it dissolves freely in hot ammonia, and crystallizes from the cold solution in large plates. It is stable at the ordinary temperature, but at 100° ammonia is evolved and a gray powder remains. When a solution of sodium thiosulphate is mixed with ammoniacal silver nitrate, no precipitation occurs, but, on adding potassium chloride or potassium nitrate, the compound just described separates in nacreous plates.

Sodium silver thiosulphate, $NaAgS_2O_3+H_2O$, is obtained in large, well-defined, monoclinic plates, when a solution of equivalent quantities of sodium thiosulphate and ammoniacal silver nitrate is evaporated over sulphuric acid (compare Lenz, *Annalen*, lx, 94). It decomposes only slowly at the ordinary temperature, but immediately on heating; at 100° only water is evolved, and a gray crystalline powder remains. It is very sparingly soluble in water, and the solution is unstable, but it dissolves freely in cold ammonia, and on adding alcohol a colorless flocculent compound, probably $NaAgS_2O_3+NH_3$, is precipitated.

It follows from the above experiments that both sulphites and thiosulphates have an asymmetrical constitution.

MINUTES OF THE PHARMACEUTICAL MEETING.

October 15th, 1889.

The meeting was called to order and on motion Mr. Wm. B. Webb was called to preside, and the reading of the minutes was dispensed with.

The Registrar stated that Mr. Good, a manufacturer of specialties in which tar was a component, had sent to the College specimen cans in which he was in the habit of putting up tar for the trade, and also an open glass jar containing some of the tar such as was put up in cans. The thanks of the College were tendered him for the same.

The Registrar stated that since the last meeting Professor Maisch had presented a copy of Buchner's Repertorium, a periodical formerly published in Germany, in one hundred and ten volumes, presenting a very complete history of pharmaceutical science during the time of its publication; these with some twenty other volumes were designed for the library. On motion a vote of thanks of the College was directed to be returned for the gift.

Professor Trimble read a paper on *food plants* in use among the Indians, which had been sent to him by Dr. V. Harvard, U. S. Army Surgeon, stationed at Fort Abraham Lincoln. The reading elicited some discussion about the value of Peucedanum eurycarpum as a food, and on motion the paper was referred to the publication committee.

Professor Trimble also read a paper, extracted from theses, upon two plants of the natural order of Labiatæ—*scullcap* and *catnep*, by Mr. Carvosso O. Myers, Ph. G., and H. R. Gillispie, Ph. G. This paper was also referred to the publication committee. Dr. Lowe said that he thought the former of these plants was losing its place in the estimation of physicians, and the latter never was prescribed, although it was a domestic remedy of frequent resort in infantile colic.

Professor Trimble inquired if *beech tar* was used in pharmacy, and the reply was in the negative, but that creasote from beech wood was considered the proper article for medicinal use; that but little of the commercial creasote was true creasote, but that beech wood creasote could be had by those who wanted it. Dr. Lowe said that it was a good thing for the students to know that two drops of this creasote in a small quantity of water is an excellent remedy for the hiccough attendant upon drunkenness; that it might be of considerable money value to remember this.

Mr. Boring said that he had a prescription for a few granules of *Atropia* $\frac{1}{120}$ of a grain each, and that no particular make was designated; that he used a half grain of atropia, dissolved it in a fluidrachm of water and used five minims of the solution to mix with sufficient sugar of milk and a little althea powder to form into the five granules of the desired strength.

Several members thought it was a very good method of compounding such a prescription as the weighing of such a small quantity as the twenty-fourth of a grain would be very difficult. It was remarked that the compounding of a prescription was one of the first duties of an apothecary, and that when no special make was designated it was the right of the apothecary to make the preparation himself.

A member made inquiry whether the hydriodic acid made by the process of the Pharmacopœia was not equal to any of the preparations so commonly pushed upon the notice of the physicians and apothecaries. It should be noted that hydriodic acid is now officinal in the form of syrup.

There being no further business, a motion to adjourn was made and carried.

T. S. WIEGAND,
Registrar.

EDITORIAL DEPARTMENT.

New Pharmacopœias.—During the summer a new pharmacopœia for Austria has been published, and a new German pharmacopœia will probably make its appearance during the coming year. The commission appointed for the last-named country consists of thirty members, among whom are to be found some of the best-known German pharmacists and teachers of pharmacy, like Vulpius, Schacht, Brunnengræber, Flückiger, Hilger, etc. The medical profession is likewise represented by well-known men. During the month of October the commission held a protracted meeting in the city of Berlin, and it was the intention to further the work to such an extent that merely the final editing should remain, which will be done under the supervision of the Health Office of the Empire.

Prohibition of Secret Remedies.—It is well known that in Germany the sale of nostrums is in various ways discouraged by the authorities, and to some extent restricted. By a ministerial decree of August 17, 1880, the apothecaries of Prussia are permitted to sell such secret remedies which contain neither poisonous nor otherwise dangerous ingredients, and the price of which does not exceed that allowed by the legal medicine tax. Quite recently, September 27th, the provincial authorities of Schleswig have gone a step further, and decreed that the offering for sale at retail, and the furnishing of secret remedies be entirely *prohibited.* It is not likely that such a radical measure will materially affect the solution of the nostrum question.

The Pennsylvania Pharmacy Board held an examination at Philadelphia on October 7th, and at Pittsburgh on the 8th. One hundred and fourteen candidates appeared for examination, sixty-three applying for Registered Pharmacists' certificates, and fifty-one for Qualified Assistants' certificates. Twenty-two of the former and twenty-six of the latter were successful.

Archiv der Pharmacie.—Profsssor Dr. E. Reichardt, who has been editor of the *Archiv der Pharmacie* since the death of Professor Ludwig, in January, 1873, has expressed the desire of withdrawing from the editorial chair. That journal being published by the German Apothecaries' Society, the directory of that body will have to fill the vacancy occasioned by the resignation, and have now announced that, beginning with the coming year, the editorial labors will be assumed by Prof. Dr. H. Beckurts, of Braunschweig, and Prof. Dr. E. Schmidt, of Marburg, both well and favorably known as writers on pharmaceutical subjects.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Étude sur la lanoline. Par Henri Galinier. Pp. 43.

On lanolin.

Les Organes sécréteurs des Végétaux et la Matière Médicale. Par Fernand Jadin, Pp. 88.

The secretory organs of plants and Materia Medica.

These two pamphlets are theses presented to the Superior School of Pharmacy at Montpellier, for the degree of Pharmacist of the first-class.

The first one mentioned contains a historic study of the uses, preparation, physical and chemical properties and physiological effects of lanolin, and concludes with a chapter on the pharmaceutical preparations of this substance.

The second pamphlet describes the nature and location of secretion organs as found in plants belonging to twenty-four different families or natural groups. The protracted investigation was undertaken with the view of generalizing the results for the various articles of the Materia Medica. Two well executed lithographic plates, each with microscopical and diagramatic drawings of seven different plant organs illustrate some of the results observed.

Le Système Nerveux des Crustacés Décapodes, et ses rapports avec l'appareil circulatoire. Par E. L. Bouvier. Paris: G. Masson. 1889. Pp. 38.

The nervous system of the crustaceans decapods, and its relations to the circulatory apparatus.

A thesis for obtaining the degree of "Pharmacien of the first class."

Recherches sur l'Ergot du Seigle. Par E. F. Belzung. Paris: Félix Alcan. 1889. Pp. 30.

Researches on ergot of rye.

La Chlorophylle et ses Fonctions. Par E. F. Belzung. Paris: F. Pichon. 1889. Pp. 106.

Chlorophyll and its functions.

Two theses by the same author; one for obtaining the degree of Pharmacien of the first class, the other presented for the *concours d' agrégation* in the Paris School of Pharmacy. The former gives a minute description of the development of ergot, and shows that during the growth of the mycelium simple starch grains are contained in the interstices of the mycelium filaments. This starch gradually disappears and is entirely absent from the sclerotium; but during the final stage of development the digestion of the reserve material is accompanied by the formation of transitory starch, usually appearing as small compound grains in the interior of the growing cells, and always free from chlorophyll.

The essay on chlorophyll is a very creditable digest of the results of the numerous researches on the nature and functions of chlorophyll. From the list of books and essays consulted by the author, 119 in number, it appears that the modern literature on this subject has been well searched, and that the most important old works have not been neglected.

Report of Willis G. Tucker, M.D., Ph. D. Analyst of Drugs. Pp. 30. A report made to the New York State Board of Health.

Of the 505 samples of 21 pharmacopœial articles examined according to the Pharmacopœia, 131 were of inferior quality, 59 not as called for, and 6 of excessive strength (dilute acids). On examining into the particulars, it is curious to observe how certain customs are perpetuated in some localities; thus, of the forty samples of *saffron* purchased (17 of which came from Buffalo stores) all were spurious and consisted of *safflower;* and of the 42 samples of precipitated sulphur, 4 were merely sublimed sulphur, and 16 contained much calcium sulphate. We know of localities where the public will not accept *crocus* when calling for saffron, and others where as *precipitated sulphur* the old-fashioned *milk of sulphur* is wanted, because it mixes readily with water. It will take a long time for the pharmacists to educate the public in every locality to abandoning old customs. This appears likewise to apply to *compound spirit of ether*, of which 53 samples were examined. Aside from three, consisting of spirit of nitrous ether, 37 were reported as being of inferior quality, probably the old-fashioned Hoffman's anodyne. The principal inferior articles, aside from the above, were dilute acetic acid (10 out of 15), and stronger ether (30 out of 72), on account of deficiency of specific gravity; syrup of ferrous iodide (7 out of

51) decomposed; potassium iodide (10 of 17) excess of alkali, etc.; and washed sulphur (10 of 26), excess of acid, and in 7 cases milk of sulphur had been sold.

Food and Food Adulterations. Part IV. *Lard and Lard Adulterations.* By H. W. Wiley. Washington. 1889. Pp. 401–554.

A full exposition of the manufacture, quality and analysis of commercial lard. The pamphlet forms part of Bulletin No. 13, Division of Chemistry, U. S. Department of Agriculture.

Bulletin No. 21 of the same series is devoted to sugar manufacture, and is entitled,

Report of Experiments in the Manufacture of Sugar by Diffusion, at Magnolia Station, Lawrence, La., season of 1888–89. By Guilford L. Spencer. 8vo. Pp. 67.

The English Sparrow (Passer domesticus) in North America, especially in its relations to agriculture. Prepared under the direction of Dr. C. Hart Merriam, Ornithologist, by Walter B. Barrows, Assistant Ornithologist. Washington. 1889. Pp. 405.

The pamphlet gives the history of the sparrow's introduction and spread in North America, and collects and arranges a vast amount of evidence relating to the habit and food of the sparrow, the injury done to various kinds of crops, the consumption of insects, the relation to other birds, etc. The pamphlet is Bulletin 1, Division of Economic Ornithology and Mammology, U. S. Department of Agriculture.

Agricultural Experiment Stations.—The receipt of pamphlets from the following stations is acknowledged:

Ottowa, Canada, Bulletin No. 4 and 5.
Massachusetts (Amherst), Bulletin No. 34.
Minnesota (St. Anthony's Park), Bulletin No. 7.
Pennsylvania State College, Bulletin No. 7.

Chemistry: General, Medical and Pharmaceutical, including the chemistry of the U. S. Pharmacopœia. A manual on the general principles of the science, and their applications in medicine and pharmacy. By John Attfield, F. R. S., M. A., Ph. D., etc. Twelfth edition. Philadelphia: Lea Brothers & Co., 1889. 12mo, pp. 770. Price, cloth, $2.75; leather, $3.25.

Attfield's Chemistry has become so well known throughout the United States, that it is probably the best known chemical work among students of pharmacy and medicine at the present time. Its success is due to the author's clear conception of the wants of the students, and to the lucid and practical manner in which this want has been supplied. When about twenty years ago the first American edition made its appearance, it at once secured for itself the favorable opinion of the teachers, as well as of the students; and with each subsequent edition this has been retained and confirmed. The one now before us will make no exception to this general rule. The book retains all its attractive features, and since it has been thoroughly revised, the information imparted by it practically embraces the researches to the present time. The most noteworthy alteration has been made in that part of the text which embraces organic chemistry, which has not only been considerably enlarged, but has also been re-arranged and largely re-written, so that it forms an excellent compendium of organic chemistry as applied to medicine and pharmacy, and which is in accord with the modern views prevailing in that science.

The book will doubtless prove to be as useful as the preceding editions have been.

The following printed Proceedings of State Pharmaceutical Associations have been received:

Georgia.—Fourteenth meeting, pp. 80.—See page 537.
Minnesota.—Fifth meeting, pp. 115.—See page 538.
Nebraska.—Eighth meeting, pp. 127.—See page 378.
New Jersey.—Nineteenth meeting, pp. 114.—See page 318.
Ohio.—Eleventh meeting, pp. 130.—See page 378.

Report of the Botanist, Dr. Geo. Vasey, for the year 1888.

This is a reprint from the annual report of the U. S. Department of Agriculture for the year 1888, and is devoted to a description of grasses and weeds growing in the arid districts of the United States, which are illustrated by 13 plates. The pamphlet contains also a comprehensive paper by F. W. Anderson on the pastoral resources of Montana.

Digest of Criticisms on the U. S. Pharmacopœia, sixth decennial edition (1880). Part II: New York, 1889. 8vo. Pp. 277.

This pamphlet, a supplement to the one noticed heretofore, is published by the Committee of Revision and Publication, U. S. P., and is intended for the use of incorporated medical and pharmaceutical societies interested in the revision of the pharmacopœia. The pamphlet is not for sale.

Monument—J. B. Van Helmont. Bruxelles, 1889. Pp. 16.

A reprint from *Bulletin de l'Académie royale de Médecine*, giving an account of the inauguration of the statue of that celebrated scientist on July 15 last, in his native city, Brussels.

OBITUARY.

George Buck died in Chicago, October 2d, at the age of 62 years. He was a native of Rochester, England, where he was educated and trained in pharmacy. Emigrating to the United States in 1855, he accepted a clerkship with J. H. Reid & Co., Chicago, with whom he remained until 1859, when he commenced business, entering into partnership with Mr. Rayner, which continued until the time of his death. Mr. Buck was an earnest advocate of thorough pharmaceutical education, and was a charter member of the Chicago College of Pharmacy, which institution he served faithfully in various capacities, and since 1886 as its president. He was active in the efforts to secure a pharmacy law for Illinois, and after the passage of the law in 1881 became the first president of the State Board of Pharmacy. The deceased was highly esteemed for his competency as a pharmacist, his sterling integrity as a business man, and his moral worth as a citizen.

Professor Adolf Ferdinand Duflos died in Annaberg, Saxony, October 9th, in his 88th year. He was born at Artenay, near Orleans, February 2, 1802, his father being a soldier in the French army. Having lost by death both his parents, his uncle, a surgeon in the French Army, took charge of the boy, and during the campaign of 1813 placed him in charge of Dr. Benedict, rector of the lyceum at Torgau, with whom he remained, an orphan without known relatives, after the uncle's death. In 1815 he entered a pharmacy at Annaberg as apprentice, remained here six years, and then became assistant in a pharmacy at Breslau where also chemicals were manufactured on a rather extensive scale. While here he wrote his first scientific essay "on the theory of the formation of ether," of which an abstract was published in Buchner's Repertorium (1824) xviii, p. 245, where it is credited to *N. J.*, vi, 1, 305 (probably Trommsdorff s *Neues Journal der Pharmacie*, vi [1822]). After acting for three years as assistant to the pharmaceutic institute at the university of Halle, he returned to Breslau in 1833, teaching chemistry at the classsical school (gymnasium), and in 1843 becoming administrator of the University pharmacy, in which position he founded the pharmaceutic institute of the University of Breslau which he conducted until 1866, when the failing of his eyesight compelled him to resign. The university, in recognition of his valuable services, conferred upon him, *honoris causa*, the titles of doctor of philosophy in 1841, and doctor of medicine in 1861.

The literary labors of Duflos have been very extensive, and were, in part, made public through numerous essays, published in various journals, on subjects connected with pharmaceutical, analytical and technical chemistry. Among his larger works may be mentioned the following: Pharmaceutico-chemical Practice; Articles of Food and their Adulterations; Agricultural Chemistry; Economic Chemistry (jointly with A. G. Hirsch); Pharmacological Chemistry; Detection of Poisons; Examination of Chemical Remedies, and Chemisches Apotheker-Buch (Chemical Book for the Apothecary). The last-mentioned work, of which the sixth edition appeared in 1880, was for many years regarded as the best and most practical work in the German language for the study of pharmaceutical chemistry and for use in the laboratory of the pharmacist.

When he vacated his academic chair, Duflos retired to Annaberg, where he was first initiated into the art and science of pharmacy, and lived with the descendants of his foster-parents until his death. As long as his eyesight permitted he continued his researches and literary work; and when he was no longer able to read, his younger friends read to him the journals published in the interest of pharmacy.

Rather few of Duflos' papers found their way into the journals of this country; but many American pharmacists were familiar with his writings, and the American Pharmaceutical Association had placed his name on the roll of honorary membership.

THE AMERICAN
JOURNAL OF PHARMACY.

DECEMBER, 1889.

OLEATES.

By G. M. Beringer, Ph. G.

Read at the Pharmaceutical Meeting, November 19.

Historical.—The medicinal application of the oleates was proposed by Professor John Marshall, of London (see Amer. Jour. of Phar., 1872, p. 317). He claimed that the oleate of mercury containing the mercury in solution in a solvent remarkable for its diffusibility and penetrating properties, was quickly absorbed, promptly producing the effect of the mercury. Numerous metallic oleates and solutions of the alkaloids in oleic acid were soon tried by various investigators, and a series of valuable papers contributed in the various pharmaceutical and medical journals mark the progress of our knowledge in this direction. Among the more notable being the papers of Dr. L. Wolff (Amer. Jour. of Phar., 1881, p. 545), Dr. J. V. Shoemaker (*Med. and Surg. Report.*, May 13, 1882), and H. B. Parsons (*Drug. Circ.*, 1885, p. 2), who furnished a series of formulas which have been made the basis of the formulas for the oleates of the National Formulary.

The oleates as originally proposed were prepared by dissolving the oxides of the various bases in oleic acid, and the oleates recognized by the United States and British Pharmacopœias are thus prepared. Unfortunately, as thus prepared they are not, as a rule, as permanent or as acceptable as those obtained by double decomposition. The oleates as now prepared by the manufacturing pharmacists are largely true oleates or oleo-palmitates or oleo-stearates of the bases prepared by double decomposition, and it is hoped by the writer that in the next revision of the Pharmacopœia formulas for such will be introduced.

The oleates which have withstood the test of therapeutical experiments and are still prescribed are the oleates of zinc, mercury, copper, lead and bismuth, and the alkaloidal solutions the so-called oleates of aconitine, cocaine, morphine, veratrine and quinine.

It is not the object of the present communication to present an entirely original line of thought, but to record a few observations on this subject and to furnish working formulas for those oleates which the pharmacist is called upon to dispense, and which will undoubtedly claim the attention of the Committee of Revision of the Pharmacopœia in 1890, and to call particular attention to a few points in manipulation which are essential to note in order to obtain good products.

First, it is to be observed that the character of the product is materially altered by the concentration of the solutions used and the temperature at which the precipitation is accomplished. The same strength of solutions will not answer for all of the oleates, nor can a uniform temperature be adopted for their precipitation.

Secondly, neutral solutions or only slightly acid solutions of the metallic salts can be used, a strongly acid solution decomposing the oleate of potassium or sodium used, with the liberation of oleic acid. On the other hand, an alkaline oleate solution will yield a product more or less contaminated with a hydrate of the base.

It was proposed by Dr. J. V. Shoemaker (*loc. cit.*) and also by H. B. Parsons (*loc. cit.*) to use a solution of Castile soap as a precipitant. The Castile soap of the market is of questionable composition, varying considerably and usually yields a solution with water which clears or subsides but slowly, and is filtered with difficulty. It seems, therefore, to me advisable to replace this with a solution of oleate of potassium or sodium prepared by saponification of oleic acid with an alkali.

The preparation of a neutral soap with an aqueous solution of alkali is difficult, the attempt resulting in a decidedly alkaline solution. If an acid oleate of the alkali is produced it will produce a cloudy solution which will not filter readily (the acid oleates of the alkalies being insoluble). For these reasons hydro-alcoholic solutions of the alkaline hydrate are used, by which means a perfectly neutral soap can be procured, which can be easily diluted with water and the solution filters easily through paper. Experiments showed that the quantity of alcohol necessary can, with proper manipulation, be reduced to comparatively a small amount.

Acidum Oleicum is stated by the U. S. Pharmacopœia to have a specific gravity 0·800 to 0·810. The U. S. Dispensatory, page 89, states that this is an error, and should be 0·900 to 0·910. Gmelin (vol. xvii, p. 64) quotes Chevreul as authority for specific gravity 0·898. The British Pharmacopœia states ·860 to ·890. While Allen (Commerc. Organic Analysis, vol. ii, p. 233) states that the pure acid "has a density of ·897 at 19° C.," and calls attention to an error in Watt, who quotes Chevreul as ·808 and says, "the same mistake is made by Wurtz and other industrious compilers and copyists." The oleic acid for pharmaceutical purposes need not be a chemically pure acid. In fact, for many oleates, notably for bismuth oleate, it is desirable to have present a small amount of stearic acid. Purified red oil answers admirably for all medicinal oleates. According to Chas. Rice (AMER. JOUR. PHAR., 1873, p. 1), such a purified acid exhibits a specific gravity of ·895 at 62° F. E. C. Saunders (*New Remedies*, June, 1880), reports ·897, while Dr. Squibb (*Ephemeris*, 1882, p. 158) states the specific gravity at ·898. Several commercial samples recently examined showed specific gravities of 0·8991, 0·8992, 0·909, at 60° F. Another sample was semi-solid at 60° F., so the specific gravity was taken at 66° F. and found to be 0·8854. Another sample received from the manufacturer without subsequent purification had a gravity of ·8846 at 60° F. The first and second were light in color and contained but small quantities of other acids. The third was very dark colored and the fourth, while of a paler color, contained a large excess of solid acids. These figures indicate that the correct specific gravity should be 0·890 to 0·900. The first acid was the one used for the experiments here recorded:

Zinci Oleas.

Oleate of zinc, $Zn(C_{18}H_{33}O_2)_2$.

Take of—

Oleic acid	1,000 grains.	
Soda[1]	160 "	or q. s.
Alcohol	6 fluidrachms.	
Zinc sulphate	550 grains.	
Water, a sufficient quantity.		

Warm the oleic acid in a capacious vessel on the water-bath to a temperature of 60° to 66° C. (140° to 150° F.), and having dissolved the soda in a mixture of the alcohol and two fluidounces of water, slowly add the soda solution, stirring constantly until the acid is entirely neutralized, and a small portion of the resulting soap dissolved in alcohol yields but a faint pink tint on the addition of a few drops of alcoholic solution of phenol phthaleine. Dissolve the resulting soap in three (3) pints of warm water and filter if necessary. Dissolve the zinc sulphate in one (1) pint of water and filter. Warm the solutions to 43° C. (110° F.), and slowly add the zinc sulphate solution to the soap solution, stirring constantly. Collect the precipitate on a moist filter, wash thoroughly with distilled water and finally dry on bibulous paper at a temperature not exceeding 38° C. (100° F.).

---

[1] The granular soda, known as Banner lye, containing about 90 per cent. of soda, was found to answer well for this purpose.

In the above formula, there is ordered an excess of zinc sulphate as this tends to more readily separate the oleate produced. It is important that the temperature of the solutions on precipitating should be maintained at 100°–110° F. At this temperature the oleate on drying is obtained in white friable masses to powder which it is only necessary to rub through a sieve. If a temperature much lower than this is used the resulting oleate is in curdy masses which are glutinous to the touch and almost impossible to pulverize. If precipitated at a higher temperature the result is a fused mass of oleate of a greasy nature, which can only be dried and pulverized with difficulty and the resulting powder is gritty. As thus obtained, oleate of zinc is a nearly white, impalpable, unctuous, slippery powder, fusing at 75° C., very soluble in ether, carbon bisulphide, chloroform, and benzol, somewhat less soluble in turpentine, petroleum ether and alcohol.

The yield was 1,122 grains, theoretical yield being 1,115 grains. The excess most likely being due to water retained at 100° F.

Plumbi Oleas.

Oleate of Lead, $Pb(C_{18}H_{33}O_2)_2$.

Take of—

Oleic acid	1,000 grains.
Soda	160 " or q. s.
Alcohol	6 fluidrachms.
Lead acetate	675 grains.

Water, a sufficient quantity.

Saponify the oleic acid as directed in the formula for zinc oleate, and dissolve the resulting soap in three (3) pints of warm water and filter. Dissolve the lead acetate in two pints of water, adding a few drops of acetic acid if necessary to produce a clear solution, and filter. Warm the solutions and add the lead acetate solution slowly to the soap solution, stirring constantly. Collect the mass on a strainer, wash and dry.

Oleate of lead thus prepared is a buff-colored firm mass, fusing at 65° C., forming an entirely clear liquid at 68° C., and is very soluble in carbon bisulphide, chloroform, ether, petroleum ether and benzol, sparingly in turpentine and alcohol. There is but little use for this oleate, as the officinal lead plaster and diachylon ointment are practically preparations of lead oleate and sufficient for its exhibition.

Cupri Oleas.

Oleate of Copper, $Cu(C_{18}H_{33}O_2)_2$.

Take of—

Oleic acid	1,000	grains.
Soda	160	" or q. s.
Alcohol	6	fluidrachms.
Copper sulphate	442	grains.
Water, a sufficient quantity.		

Saponify the oleic acid as directed in the formula for zinc oleate, and dissolve the resulting soap in three (3) pints of water. Dissolve the copper sulphate in one pint of warm water and filter. Warm the solutions to about 140° to 150° F., and slowly add the copper solution to the oleate of soda solution, stirring constantly; warm until the copper oleate fuses into a mass, decant the clear supernatant liquid, wash several times with warm water, and finally dry on the water-bath.

Yield, about 1,100 grains, theoretical yield 1,108.

Oleate of copper, as thus produced, is a bright green waxy mass, fusing at 49° C., very soluble in carbon bisulphide, chloroform, benzol, ether, turpentine, petroleum ether, absolute alcohol, alcohol and fixed oils.

Hydrargyri Oleas.

Oleate of Mercury, $Hg(C_{18}H_{33}O_2)_2$.

The oleate of mercury is perhaps the oleate most frequently prescribed, and which, made in accordance with the Pharmacopœia by dissolving the oxide in oleic acid, is a very unstable compound. The very excess of oleic acid being the prime factor in causing its decomposition. Several writers have proposed to make the officinal oleate a twenty per cent. solution of the oxide in oleic acid. This, while a more stable preparation than the present officinal ten per cent. solution, is more susceptible of change than a true oleate made by double decomposition. It seems to me to be far better to make the officinal a true oleate in composition as well as in name. Dr. J. V. Shoemaker (*loc. cit.*) proposed to make such an oleate of mercury by decomposing oleate of soda solution by means of mercuric chloride, the solutions being mixed and boiled until the resulting oleate furnished a mass. The long boiling always resulted in a partial decomposition of the oleate, more or less of the mercury being reduced. H. B. Parsons (*loc. cit.*) proposed the decomposition of potassium oleate by means of a solution of mercuric nitrate. Mr. Louis Dohme (Amer. Jour. Phar., 1873, p. 158) proposed a similar formula. With proper care this method will yield good results. The following is the formula I have used:

Take of—

Oleic acid	1.000	grains.	
Potassa	220	"	or q. s.
Red oxide of mercury	383	"	
Nitric acid	323	"	or q. s.
Alcohol	6	fluidrachms.	
Water, a sufficient quantity.			

Saponify the oleic acid with the potassa as directed in the formula for zinc oleate, and dissolve the resulting soap in two pints of warm water and filter. Mix the nitric acid with the two fluidounces of water, heat to boiling and add the mercuric oxide previously reduced to powder. Boil until it is entirely dissolved, adding, if necessary, a few drops of nitric acid additional. Dilute the solution of mercuric nitrate with four fluidounces of water. Warm both solutions to 66°C. (150°F.) and add the oleate of potassium solution to the mercury solution, stirring constantly. Decant the aqueous solution and wash the precipitate with warm water not exceeding 150°F. If precipitated at a much lower temperature it will be necessary to heat the mixture to near boiling in order to form a mass of the precipitate, which heating is almost certain to result in a partial decomposition of the oleate. The same is apt to result if the solutions are mixed at a higher temperature. In connection with this we recall the experiments of Chas. Rice, who proved that as the temperature was advanced in preparing oleate of mercury the quantity of oxide reduced greatly increased. (Amer. Jour. Phar., 1873, p. 1).

The yield by the above formula was 1,329 grains, theoretical yield being 1,350 grains. Oleate of mercury as thus prepared is about the color of a very pale citrine ointment and of somewhat softer consistency, fuses at 66° C. (150° F.), yielding an entirely clear fluid at 70°C. It is very soluble in carbon bisulphide, chloroform, ether and turpentine, and yields an opalescent solution in benzol and petroleum ether, and is slightly soluble in absolute alcohol and alcohol.

The aqueous solution decanted from the precipitate gave no indications of mercury with solution of potassa or potassic iodide, proving the complete precipitation of the metallic salt.

The sample shown, marked No. 1, was prepared over four months ago, and has been purposely kept in a warm part of the store in a flint vial, the stopper being occasionally removed. The surface exposed to the light now shows a reduction of the mercury, which was not very marked until three months of summer weather had elapsed since the preparation. The second sample was prepared about a week ago.

Bismuthi Oleas.

Oleate of Bismuth, $Bi(C_{18}H_{33}O_2)_3$.

The most difficult oleate to prepare by double decomposition is the bismuth oleate. The tendency of bismuth solutions to precipitate oxy salts unless in decidedly acid solutions, and the decomposition of the oleate solution used by the acid solution renders it almost impossible to thus make this oleate. Mr. H. B. Parsons (*loc. cit.*) attempted to overcome this difficulty by using a solution of crystallized nitrate of bismuth in glycerin. Even this is apt to yield unsatisfactory results. I have obtained more satisfactory results by saponifying the acid with oxide of bismuth. On heating oxide of bismuth with oleic acid but a very small portion is dissolved; on boiling them together with water, however, saponification takes place. Owing to the variability of commercial subnitrate of bismuth (see AMER. JOUR. PHAR., 1888, p. 385) good results were not obtained by taking a definite weight of that salt and precipitating the hydrated oxide from its solution in nitric acid. The quantity of hydrate varied so much as to yield on boiling with the calculated quantity of oleic acid an oleate of too soft a consistence. For these reasons I prefer to use an oxide dried at 212°F.

The following is the formula I prefer.

Take of—

Bismuth oxide dried at 100° C. (212° F.) until it ceases to lose water	1 troy oz.
Oleic acid	3 troy oz. and 295 gr.
Water, a sufficient quantity.	

Rub the oxide of bismuth to a fine powder, and thoroughly mix it with the oleic acid in a capacious vessel, add two pints of water and boil the mixture, replacing the water as it evaporates, and stirring frequently until complete saponification has taken place and a small quantity of the mass dropped into cold water yields an ointment-like mass without any separation of oleic acid. Decant the water from the oleate and work the mass with a horn or wooden spatula to free it from retained water.

Bismuth oleate thus prepared is a cream colored mass about the consistence of an ointment, softening at the temperature of the body and fusing at 58° C. It is easily decomposed by contact with metals, and is but very slightly soluble in the usual solvents for oleates.

COMMERCIAL TAR.

By R. G. Dunwody.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 62.

Tar, as found and used in the United States, is the product of the incomplete combustion of the fat pine or *Pinus palustris* and some other pine species. North Carolina produces most of the tar exported from this country, although small quantities, especially for home consumption, are manufactured in South Carolina, Georgia, and several other of the Southern States. There are at least three methods by which tar is made, perhaps the simplest being that in which the wood is cut into short lengths, split, and the pieces wedged vertically into an iron pot so as to project some distance above the vessel. The whole is then inverted over another iron pot and the wood ignited, the flame rises around the outside of the pot, melting the resin in the wood which is partly burned on reaching the flame and drops down into the vessel below. This process is employed by pharmacists and others who wish to produce a small quantity of tar for their own use.

A second method adopted for the same reasons consists in cutting the wood into lengths of two to three feet, splitting to a diameter of about two inches and placing a number of these at the top of an inclined plane of sheet iron ; on igniting the wood the tar runs down the plane and is collected below. The third method is used in preparing larger quantities and consists in cutting the wood into lengths of two to three feet, splitting it into billets and arranging the end in a pile six to eight feet diameter, covering with bark and then with clay. A fire is then kindled on top, the fuel being some of the poor pieces of pine and when the whole becomes heated, the tar runs off below through an iron pipe previously inserted for the purpose. The first two processes are very wasteful and the product is much darker than that prepared by the last method, which yields a lighter colored product of a very characteristic tar odor.

Living in the State of Georgia and in a locality to see something of the manufacture of tar by the above mentioned processes, I procured a sample made by the third method, which nearly represents the commercial article. I was also supplied by Mr. Fletcher with a sample made by the first process, from his locality, near Little Rock, Arkansas. A third sample—"North Carolina pure pine tar, refined and especially adapted for medicinal or any other purposes," put up and sold by Mr. Good, of Philadelphia—was procured from the College Cabinet, and examined with the other two. It is labelled as coming from North Carolina. An account of the method used in refining it may be found in the AMER. JOUR. PHAR., 1889, page 234, by Dr. C. B. Lowe.

The three samples were first spread in thin layers on glass. On holding towards the light the refined tar was found to be smooth and amorphous, while the other two samples were shown to be largely composed of granular transparent masses, which under the microscope assumed a crystalline form, showing brilliant effects with polarized light. These crystals, according to Flückiger (*Pharmacographia*, 2d ed., page 622), are pyrocatechin. The specific gravity of the refined tar was found to be 1·040, that from Georgia 1·083, and the sample from Arkansas 1·090. The average specific gravity of tar from coniferæ is said to be 1·060. None of the samples were completely soluble in petroleum ether (b. p. 25°–40° C.). All were soluble in 95 per cent. alcohol, absolute alcohol, ether, and chloroform. All were acid to litmus paper and imparted an acid reaction to water. Ten grams of each sample were digested with water for forty-eight hours, the clear aqueous solutions, which had become yellow in color, was separated, agitated with ether, and the ether allowed to evaporate spontaneously, when a brown somewhat oily residue was obtained in every case. The residue was nearly completely soluble in water, and the aqueous solutions when treated with ferric chloride gave greenish colors, with ferric acetate darker colors, with ferrous sulphate no change, with calcium hydrate red-brown colors, and with gelatin no change. These tests all indicate the presence of pyrocatechin, and judging by the colors it was most abundant in the Arkansas and Georgia tar, and almost absent in the refined tar. The remaining aqueous solutions left after making the above tests were allowed to evaporate spontaneously over sulphuric acid and deposited a somewhat crystalline residue, most marked in the Georgia sample and least in the refined sample. No sediment was found in any of the samples, and they dissolved completely without leaving sand, chips, or clay behind.

It is suggested that this refined tar had lost much of the pyrocatechin through contact with water.

It appears from the above results that the best method of examining a sample of tar would be to take its specific gravity, try its solubility with the above solvents, and examine the ethereal solution of the aqueous extract for pyrocatechin. Comparing a thin layer on glass with a sample of known purity, a microscopic examination would also be of value in determining the quality of a sample.

CONTRIBUTION TO THE KNOWLEDGE OF BORON.

By Henry C. C. Maisch, Ph.G., Ph.D.

During his researches on the electrolysis of the alkaline oxides and hydroxides, Sir H. Davy also subjected boric acid to the action of the electric current (*Phil. Trans. Royal Society*, 1808, p. 43). He obtained a black combustible substance, which, however, he did not further describe. Without doubt he was the first to obtain boron in the free state, though to two French chemists, Gay Lussac and Thénard (*Gilb. Ann. der Phys.*, 1808, p. 30), belongs the credit of first describing the element, which they obtained by the action of potassium on melted boric acid. During the year 1888, W. Hampe (*Chem. Zeit.*, xii, 841) prepared boron by the electrolysis of borax, which he melted in a graphite crucible.

Wöhler and Deville (*Ann. Chim. Phys.*, 1858 (3), lii, p. 84) during their classic researches on boron and its compounds employed the process of Gay-Lussac and Thénard, using potassium or sodium, but they also found that by using aluminium crystalline boron was obtained.

We are indebted to Berzelius for two further methods: (1) by the action of potassium on boron fluoride, and (2) by the action of potassium borofluoride at the fusing point of the former. Wöhler and Deville (*l. c.*) and Geuther (*Jenaische Zeitschr. für Med. und Naturw.*, ii, p. 209) found that in place of potassium or sodium, magnesium could be used to advantage in the last method.

On the advice of Prof. L. Gattermann, I took up the reduction by means of magnesium, using in place of potassium borofluoride the cheaper borax. This was employed in the form of powdered borax glass because the water of crystallization otherwise present would have an injurious effect on the reaction.

Without going into details as to the experiments made with the idea of finding the best proportion of the reagents to be used, I will simply give the one which was found to be the best. The bottom of a hessian crucible was covered with the powdered borax glass, on this an intimate mixture of two parts borax and one part magnesium powder was packed, so as to drive out as much air as possible, and this was covered by about half an inch of powdered borax glass, which is to fill the crucible. The lid is then fastened down with moist clay and the whole subjected to the heat of a well-drawing charcoal furnace, the crucible being surrounded by the fuel, which is allowed to burn down once. After cooling, the crucible is broken and the product finely pulverized. The powder is extracted with boiling water, and, after cooling, thrown in small portions into cooled diluted hydrochloric acid and allowed to remain for four or five hours, after which it is filtered off and subjected to the action of concentrated hydrochloric acid for about two hours. The powder is then filtered off, washed with water and dried either by the heat of a water bath or by the following method: The water is replaced with alcohol, this in turn by ether, and this allowed to evaporate at the temperature of the room. The boron thus obtained is by no means pure, but answers perfectly well for the preparation of its halogen derivatives.

Boron trichloride.—The first method to be found in literature is that of Berzelius (*Pogg. Ann.*, 1824, ii, p. 147) who states that amorphous boron which has been dried in a vacuum ignites in an atmosphere of chlorine at ordinary temperatures, while boron which has been heated reacts only at higher temperatures. Some decades later Wöhler and Deville (*l. c.*) showed that the same takes place in hydrochloric acid gas; the reaction, however, must be completed at higher temperatures. They also found that by the action of boron on mercuric chloride, lead chloride, or silver chloride this compound was likewise obtained.

The method which has been used up to the present for the preparation of the chloride is that of Dumas (*Ann. Chim. Phys.*, 1826, xxxi,

p. 466; xxxiii, 376), who allowed chlorine to pass in a tube over a heated mixture of powdered melted boric acid and charcoal.

It seemed to be of interest to ascertain how the boron prepared by the above method would behave towards chlorine. The apparatus which was used was the following: A hard glass tube, as used for combustions, about 4 to 8 inches longer than the combustion furnace to be used, is drawn out at one end and bent almost at right angles. This part is attached to a Peligot's tube, which is surrounded by a freezing mixture of ice and salt. All the necessary joints are made by means of smooth and closely-fitting corks. The air-dry boron is loosely spread in the combustion tube, so that it is one-fourth inch in thickness all through; and as the boron must be thoroughly dry the water is driven out by heating in a stream of hydrogen, also allowing it to cool in the same. Carbonic acid cannot be used, as boron reduces it completely to carbon monoxide, as noticed by Lorenz (*Ann. Chem.*, 1889, ccxlvii, p. 226). After the tube has cooled the hydrogen is forced out by a stream of dry air, and the larger end of the tube then connected with a chlorine generator. The chlorine is prepared from manganese dioxide and hydrochloric acid, and best regulated so that a slow but steady stream is obtained. The whole apparatus is filled with washed and dried chlorine gas before heat is applied, sufficient for producing a slight glow in the tube. A liquid having the color of chlorine gas condenses in the Peligot's tube, which is best connected with a good drawing chimney, as some of the trichloride goes through uncondensed. The color of the liquid is due to dissolved chlorine, which is removed by shaking the liquid with mercury in a sealed tube, which can also be used for distilling. After the liquid has become perfectly colorless, which takes about two days, the tube is opened and by means of a closely-fitting cork a narrow glass tube, twice bent at right angles, is attached. The one arm of the tube which is used as a condenser is to be about 20 inches long and projects to the bottom of the receiving vessel, which is surrounded by a freezing mixture of ice and salt. The best receiver is a wide glass tube about 25 inches long and about 5 inches below the orifice drawn out, so that the condensing tube just moves freely in the opening. The distillation is best carried on by means of warm water, very slowly, so as not to lose too much of the chloride—this boiling at 18° C. The yield of the chloride by this process is as follows: By using 8 gms. of magnesium powder for reduction the boron gave 15 gms. of the chloride, the theoretical yield being 26 gms.

ANALYSIS OF BLACKBERRY BARK.

By Gustav Adolf Krauss, Ph. G.

Abstract from an Inaugural Essay.

The results of the anylysis of the root bark of *Rubus villosus* are given in the following table:

Treatment with

Petroleum ether	Volatile oil	0·015	
	Wax and bitter principle	0·015	
	Fixed oil	0·230	
			0·26
Absolute ether	Gallic acid	0·370	
	Resin soluble in alcohol	0·650	
	Resin insoluble in alcohol	0·050	
			1·07
Absolute alcohol	Phlobaphene	0·870	
	Tannin	6·530	
	Extractive	4·100	
	Villosin	0·800	
	Glucose	0·420	
			12·72
Distilled water	Mucilage	2.260	
	Dextrin	2·500	
	Other carbohydrates	4·220	
	Tannin	4·900	
	Other compounds precipitated by lead acetate	0·550	
	Glucose	1·250	
	Saccharose	0·170	
			15·85
Soda solution	Pectin and albuminoids	0·600	
	Phlobaphene	0·800	
			1·40
Weak HCl	Pararabin etc.	4·800	
	Starch	3·580	
			8·38
Chlorine	Incrusting matter		13·00
HNO_3 and $KClO_3$	Intercellular matter		17·00
Residue	Cellulose and sand(1·35)		16·48
Ash			3·16
Moisture			10·60
Loss			0·08
			100·00

In the examination of the alcoholic extract evidence having been obtained of the presence of a glucoside, numerous experiments were made with the view of isolating it; the following deserve to be mentioned:

The aqueous solution of the alcoholic extract was freed from tannin by means of lead acetate, the filtrate treated with H_2S, and the clear liquid evaporated; decomposition took place with the production of an insoluble resin-like body.

The alcoholic percolate of the drug was macerated with freshly precipitated ferric hydrate; the latter, prepared from 500 cc. of solution of tersulphate of iron, is used for the tincture from 500 gm. of bark. The alcoholic filtrate, to which the washings have been added, is subjected to distillation until the alcohol has been completely removed; the cloudy residue is filtered and the filtrate, mixed with absolute ether and frequently shaken, is set aside for twelve hours, when the glucoside is separated in fine needles. A more complete precipitation takes place when chloroform is used instead of ether; but the precipitate is amorphous.

Nearly as good results are obtained by mixing the powdered drug with milk of lime, drying the mixture, exhausting it with boiling alcohol, evaporating, treating the residue with ether and subsequently dissolving in alcohol.

The glucoside, for which the name of *villosin* is proposed, forms fine silky needles melting at 173–175° C. to a brown mass; heated on platinum foil it melts and burns with a sooty flame, leaving no residue. It is freely soluble in methyl, ethyl and amyl alcohols, sparingly soluble in water, slightly soluble in petroleum benzin, insoluble in chloroform and nearly so in ether. The taste is bitter, best perceptible in the alcoholic solution. The aqueous solution is not precipitated by lead acetate, but yields a precipitate with lead subacetate. Villosin does not reduce silver nitrate, even on heating. Ferrous and ferric salts cause no change. Alkalies color lemon yellow. Sulphuric acid colors light brown, changing to deep violet with little water. Sulphuric with a drop of nitric acid colors deep orange, then red, by heat destroyed. Froehde's reagent colors dark brown, and on heating, brown green; but Froehde's reagent with a drop of nitric acid gives a red color. An aqueous solution, containing in 5 cc. 0·030 gm. of the glucoside, yielded with Fehling's solution 0·020 gm. precipitate; on boiling the solution previously with dilute acid the precipitate weighed 0·024 gm.

For estimating the tannin 10 gm. of the bark were exhausted with 93 per cent. alcohol, the tincture evaporated, and the extract dissolved in water. Using Mueller's method 9·19 per cent. of tannin were found; by Guenther's method, 9·88 per cent., and by Lœwenthal's method 10·3 and 10·4 per cent. But working with cold infusions of the bark, the results were as follows: by Guenther's method 10·0 per cent., and by Lœwenthal's method 11·1, 12·5 and 11·8 per cent.

NOTE ON ADULTERATED SPANISH SAFFRON.

By G. M. Beringer, Ph.G.

Read at the Pharmaceutical Meeting November 19.

Two lots of adulterated saffron have recently come under my notice. The first was of a handsome color, excellent in odor, and brought a very high price. It yielded on incineration 40 per cent. of ash. On close inspection it was found to be an admixture of vegetable fibre of unknown origin with a small quantity of genuine saffron.

The fibre was in pieces from ½ inch to 1½ inches long, and upon microscopic examination proved to be the stem of a monocotyledon, most likely a species of grass. This was loaded with a calcium sulphate artificially colored, and attached thereto with some saccharine substance, most likely glucose. A small quantity thrown on water soon deposited a heavy precipitate of the sulphate, tinting the water a pinkish yellow.

A portion was taken from the centre of the can, and of this 5 gms. was carefully weighed and then carefully picked over, separating the true saffron and the adulterant. The following statement exhibits the proportion of each :

·915 gms.	genuine saffron.
3·745 gms.	adulterant.
·240 gms.	refuse so broken as to be impossible to separate.
·1 gm.	loss in handling.
5·000 gms.	

From these figures it would appear that the saffron contained only about 20 per cent. of genuine saffron.

The adulterant yielded 52·7 per cent. of ash, containing considerable calcium sulphide.

The coloring matter of the adulterant was found to yield an orange-yellow solution to alcohol, and when thus extracted and the solvent evaporated was obtained as an orange-red powder, which dyed silk a bright yellow and showed with reagents the following reactions: With concentrated sulphuric acid a violet-red, on diluting the color gradually fades. With concentrated hydrochloric acid a violet-red, on diluting destroyed. With sodium hydrate the color gradually fades. With ammonium hydrate the aqueous solution produces a bright yellow color. Stannous chloride and hydrochloric acid destroyed the color. Its aqueous solution is bleached by calcium hypochlorite and precipitated as a pale yellow precipitate by lead acetate. These reactions point to the presence of some artificial non-vegetable coloring.

The true saffron in the mixture yielded 5·7 per cent. of ash, about the normal amount, and deposited no pulverulent substance on soaking in water.

A somewhat similar adulteration of saffron was reported by W. Brandes, *Pharm. Ztg.*, 1879, p. 506 (see AMER. JOUR OF PHAR., 1879, p. 558), who reported 50 per cent. of stems obtained from a plant belonging to the Gramineæ or Caricineæ, probably from Cavex capillaris, the stems being loaded with calcium carbonate previously colored with cochineal.

The second lot of saffron was genuine Spanish saffron, excellent in color and odor, contaminated with but a small quantity of the yellow styles and a few stamens, but loaded with sodium sulphate. It yielded 17 per cent. of fusible ash. The adulteration of saffron with soluble salts, such as the borate, carbonate and sulphate of sodium and ammonium salts, has been previously reported in France by M. Adrian (*Jour. de Pharmacie et de Chimie*, 1889, p. 98), and in England by E. M. Holmes (*Phar. Journ. aud Trans.*, February, 1889, p. 666).

GLEANINGS FROM THE GERMAN JOURNALS.

By FRANK X. MOERK, PH. G.

Tannin is warmly recommended in cases of severe burns and scalds, it quickly relieving pain and causing rapid healing. It is applied in 5 per cent. solution by allowing the solution to trickle over the sore; this is repeated whenever the bandage is changed; a cooling ointment is applied after the tannin solution.—*Pharm. Ztg.*, 1889, 630. (See also AMER. JOUR. PHAR., 1886, p. 611.)

Sodium thiosulphate in commercial bicarbonate is occasionally found; the quantity being generally small, J. Lüttke uses the following method for its detection: A solution of the bicarbonate (1:30) is acidified with hydrochloric acid and a few cc. of a solution of barium nitrate added; in presence of *sulphate* a white turbidity is produced which must be removed by filtration after standing for some time. To the clear filtrate is now added a single drop of a solution of permanganate of potassium (1:1000) when if thiosulphate was present a white precipitate of barium sulphate is produced.—*Pharm. Ztg.*, 1889, 629.

Precipitated zinc sulphide has been used both internally and externally, with good results in chronic eczema and psoriasis. For internal use Barduzzi prescribes: Zinc sulphide 0·50, extract of gentian, sufficient to make 50 pills; from 3 to 12 pills are taken daily. Externally it is applied: Zinc sulphide 5·0, lanolin 20·0, lard 30·0.—(*D. M. Ztg.*) *Apoth. Ztg.*, 1889, 1184.

Annidalin, a patented substitute for iodoform, is an iodine derivative of thymol made by the action of iodine upon an akaline solution of thymol. It is of a red color and in the dry state retains its color for months, if kept in the dark; in the presence of moisture or on exposure to light, iodine is liberated. This preparation is one of a new class of phenol derivatives; the corresponding compound of phenol or carbolic acid has the formula $C_6H_3I_2.OI$ and is isomeric with the well-known *triodophenol* $C_6H_2I_3.OH$. This forms an odorless, violet-red preparation, insoluble in water and dilute acids, soluble in alcohol, ether, benzol and chloroform; it melts at 157°C., decomposing at the same temperature.—(*Ber. D. Chem. Ges.*) *Pharm. Centralhalle*, 1889, 637.

Oil of Cinnamon.—The adulteration of commercial oils with rosin (AM. JOUR. PHAR., 1889, 575) is confirmed by the work of Dr. H. Gilbert, who also advances a simple test for the detection of this adulterant and gives some data on the resinification of oils of cinnamon. The detection of non-volatile matter is effected by exposing one gram of the oil in a flat watch-crystal to 110°–120° C. in an air-bath until constant weight is obtained. Various cassia oils yielded from 5 to 30 per cent. residue, two oils (guaranteed pure) 6 and 11 per cent. and in genuine Ceylon oil 2 to 3 per cent. residue. To determine if exposure to light and air could cause such an increase of residue (20–30 per cent.) a steady current of air was passed through a sample of pure cassia oil (leaving 6 per cent. residue) and also one of pure Ceylon oil (with 2 per cent. residue) for *forty* hours; the experiments were conducted near a window so as to expose to as much sunlight as possible during the time. The residue from the cassia oil amounted to 6·5 per cent., from the Ceylon oil to 3·5 per cent.; while resinification could be detected under these favorable conditions, still it was so slight that exposure could not account for very high percentages of residue. A sample of pure cassia oil (specific gravity 1·060) after the addition of 20 per cent. rosin had the specific gravity 1·065. The crystals obtained by mixing the oil with nitric acid can not be considered as a reliable test, as adulterated oils will also give the crystals and a pure oil at times fails to produce them. The acidity of the oils gives important information as to the presence of rosin and is best determined by dissolving 2 gm. oil in 30 cc. alcohol, adding a few drops of phenolphthaleine and titrating with alcoholic potassium hydrate; the number of milligrams of KOH required to neutralize one gram oil gives the acidity figure.

Pure cassia oil (6 per cent. residue) 13; this was not changed by passing air through it for forty hours. Pure Ceylon oil (2 per cent. residue) 9; another sample (2·5 per cent. residue) 10. An adulterated sample of cassia oil (28 per cent. residue) 47; sample of cassia oil to which 20 per cent. rosin had been added, 40. Rosin has an acidity figure of 150. The figures just quoted render the method an important one.—*Chemiker Ztg.*, 1889, 1406.

Ricinin, the poisonous principle of castor oil seeds, is not, as has been claimed, an alkaloid, but is an albuminoid, one of the phytalbumoses and belongs to the class of unorganized ferments. Boiling its solutions almost immediately destroys its activity, while heated dry it is not easily decomposed. It can be prepared from the seeds (after removing the integuments and the oil) by percolating with a 10 per cent. salt solution. The percolate is saturated with sodium and magnesium sulphates and allowed to stand in the cold, when besides the double salt there forms a white precipitate, easily separated from the crystals, which is filtered off and transferred to a dialyzer. In the dialysis the temperature must be kept sufficiently low to prevent decomposition. The slimy mass is scraped from the septum and dried in vacuo over sulphuric acid; after drying the masses are very easily pulverized and yield an odorless white powder, still retaining from 10–20 per cent. ash which, however, does not interfere with its physiological action. The powder can be preserved for long periods; its best solvent is a 10 per cent. salt solution which for experiments can be diluted without formation of an immediate precipitate. The varities of Ricinus, Croton Tiglium and Jatropha Curcas all appear to contain poisonous albuminoids which are similar, if not identical. Attention is called to the danger arising from the accumulation of castor oil press-cakes which contain a substance more poisonons than arsenic (and for which no test is known) and which can so easily be obtained by any one; the suggestion is also made that the manufacturers of castor oil should be compelled to use the press-cakes as fuel as soon as they are taken out of the press or else to mix with water and boil to destroy the activity of the poison.—Hermann Stillmark, Aus den Arbeiten des pharmakologischen Instituts zu Dorpat. *Pharm. Centralhalle,* 1889, 650.

The Examination of Castor Oil.—The specific gravity 0·950-0·970, the deposition of crystalline floccules at 0°C., the solubility in alcohol and glacial acetic acid, and the absence of a dark brown color if 3 parts castor oil be mixed with 3 parts carbon disulphide and 2 parts sulphuric acid, while sufficient to detect foreign vegetable oils, will not detect rosin oil owing to similar behavior towards the above reagents. Rosin oil may be detected by saponification and agitation of the aqueous soap solution with ether, separating and evaporating the ethereal solution when the rosin oil will be obtained. The behavior with nitric acid of sp. gr. 1·31 is also of value. Castor oil is colored only slightly brown, while the acid solution remains colorless; in the presence of rosin oil the oily layer will be decidedly dark colored (almost black) and the acid layer will be of a brownish color. A sample of castor oil examined contained about 19 per cent. rosin oil, and gave satisfactory results with the tests first mentioned.—Dr. H. Gilbert, *Chemiker Ztg.,* 1889,1428.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

MERCURIAL FLANNELS.—Prof. Merget in a recent thesis supporting the belief that mercury cannot be absorbed by the healthy skin, and that mercury inunctions act only through the respiratory organs, which absorbed their vapor, proposed the use of mercurialized flannels to replace the inconvenient ointments now employed. M. Carles explains (*Gaz. des Sci. méd. de Bordeaux*) how these should be prepared. Thick, soft flannels should be first relieved of fatty matters by soaking for three hours in a 25 per cent. solution of bicarbonate of soda, after which they are lightly wrung out and plunged into clear water. After a second wringing, made gently—with the object of retaining a portion of the alkaline salt—they are placed for four or five hours in a saturated solution of nitrate of mercury. As strong vapors are thus disengaged, the process should be carried on under a chimney of some sort. The flannels should then be lightly soaked in a 1 to 2 solution of liquor ammoniæ and, when a grayish cast shall have been obtained upon them, should be dried in a shaded place in the open air. They are then beaten, to remove the metallic particles, and put away in glass-stoppered bottles. In using, a square of 25 centimeters is placed upon the chest, or, at night, in a small, open bag upon the patient's pillow within the influence of the respiratory organs. These flannels give off mercurial vapors for years, but the dose gets too weak for therapeutic purposes in about three weeks, when they should be renewed. They are eligible for use against *pediculi pubis* and other skin parasites.—*Répert. de Phar.*, Oct.

COMPOSITION OF ABSINTHE.—As one result of physiological and chemical researches made on absinthe by M. M. Cadéac and Albin Meunier (*Acad. de Méd.*, Sept. 10), the constituents of absinthe, as ordinarily made, are given as follows: volatile oils of anis, 6 gm.; of illicium, 4 gm.; absinthium, 2 gm.; coriander, 2 gm.; fennel, 2 gm.; menthe, 1 gm.; hyssop, 1 gm.; angelica, 1 gm.; melissa, 1 gm.; alcohol, 70 per of cent.. colored with the fresh leaves of dead nettle [*ortie*] or parsley. The authors think that the poisonous properties of absinthe liquor are chiefly due to the oils of anis and of illicium; not that these are very toxic in the ordinary sense, but that they constitute a poison against the nervous centres, diminish muscular energy, paralyze the will, cause vertigo, trembling, stupor, etc., and, at times, epileptiform convulsions. The authors think that the wormwood contained in the liquor is nearly innocuous, and that the formula would be sufficiently amended by largely decreasing the amounts of illicium and anis contained in it.

DISINFECTANT DENTIFRICE.—Prota-Giurleo gives the following: Alcohol of 40 per cent. 500; camphor, 10; salicylic acid, 20; benzoin, 50; clove stalks, 100; hypochlorite of lime, 50; essence of anis, 20; glycerin, 500. All of the substances except the hypochlorite and anis are placed in a strong, closed flask which is subjected in a water bath to 60° C. of heat for five hours, agitating occasionally. After macerating for eight days and filtering, the hypochlorite is added, when a further maceration of eight days is given, when the anis is added and the preparation is finally filtered. The liquid should be put up in small blue or yellow phials. This preparation perfumes the mouth, whitens the teeth and frees the adherent tartar. It also hardens the gums and arrests gingival hemorrhages. For a mouthwash two teaspoonfuls are added to a quart of water.—*Farm. Ital.; Boll. Ital.; Répert. de Phar.*, Oct.

REACTIONS OF THE NAPHTHOLS.—The naphthols are very soluble in alcohol, ether, chloroform and the alkalies, soluble in glycerin, and sparingly soluble (20 cgm. to 1,000 gm.) in water; alcoholized water dissolves them fairly well for practical purposes. M. Verhassel presents the following list of reactions abtained directly, without previous solution:

	Alpha naphthol.	Beta naphthol.
Chloride of lime liquor.	Violet coloration.	Yellowish green.
Ferrocyanide of potass.	"	Faint yellow.
Ferricyanide of potass.	Brown.	Greenish yellow.
Ammonia.	Colorless.	Greenish.

When the naphthols are dissolved in alcohol and water, perchloride of iron gives an abundant violet precipitate with alpha naphthol, which becomes white and then disappears. With beta naphthol it gives an emerald green color, and, with an excess of the reagent, a greenish precipitate.—*J. de Phar. d'Anvers*, Sept.

REACTION OF SACCHARIN.—The solution containing saccharin is evaporated in a porcelain dish, and the residuum treated with nitric acid. A fragment of caustic potash is added, and one or two drops of 50 per cent. alcohol; the mixture is then heated. If saccharin be present the mixture turns to a violet blue color and then to red. The presence of a half milligram of saccharin may thus be detected.—*Ann. di Chim. e di Farm. et Or.; Répert. de Ph.*, Oct.

LOCAL ANÆSTHESIA WITH SELTZER WATER.—Dr. Voituriez, (*J. de sci. méd. de Lille*) recommends the use of siphons of seltzer water for this purpose, the jet being held at about ten centimeters from the region to be anæsthelized. He uses at first two or three bottles of the seltzer, which gives anæsthesia for four or five minutes, when a small additional quantity will suffice to prolong the effect.

NATIVE WYOMING SOAP.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 63.

BY HERMANN WESTPHAL, PH. G.

This mineral, which is known locally under the name of "Native Wyoming Soap," occurs in the Blue Ridge, 30 to 40 miles west and southwest of Sundance, Wyoming Territory, at an elevation of about 5,000 feet.

It is found in two distinct forms. 1. *The wet variety*, which occurs in sink holes, or in the neighborhood of springs, and covers, probably, an area of several hundred acres. It forms a thick very tenacious pasty mass, about the consistency of butter. Its color is light yellowish gray. Taste slightly saline, clay-like. Odor argillaceous. Moistened between the fingers with a little water it feels like soap or some greasy substance: hence its name. This soapy feel is probably due to the extreme fineness of the silicates which it contains. In hot weather, the edges of the sink holes become hard and brittle, and on some places show an efflorescence of fine crystals of magnesium sulphate.

These holes, which seem to be almost bottomless, at times become very annoying to the ranchers, as cattle frequently get into them, and unless discovered in time and pulled out are sure to perish, as it is impossible for them to free themselves.

2 *The dry variety* occurs underground in veins like coal. It is hard and dry, and looks very much like chalk; the color is somewhat darker, varying from yellowish-white to dirty greenish-yellow. On addition of a little water, howerer, it is converted into the soft variety as found on the surface of the earth. It appears probable that the wet variety is formed by springs running over beds of the dry soap, washing it up and in time accumulating it in large quantities.

It is used by cowboys and ranchers who live in the vicinity as a substitute for soap, and for removing grease by absorption. They also use it for making "hard water."

Five grams of the soap, exposed to the atmosphere for several weeks, at a temperature of about 24°C. lost 41·20 per cent. of moisture. It had become a very hard and brittle mass varying from dirty white, grayish-green to orange-yellow. Taste and odor were unaltered; it adhered to the tongue, and when cut with a knife exhibited a very smooth and shining surface. On ignition the wet soap lost 53·30 per cent. while the air-dry lost 12·10 per cent. corresponding to 41·20 per cent. on exposure. The air-dry soap reduced to an impalpable powder gave the following composition on analysis:

SiO_2	61·08	per cent.
Fe_2O_3	3·71	"
Al_2O_3	17·12	"
MnO	traces	
CaO	2·96	"
MgO	1·82	"
Na_2O	0·20	"
SO_3	0.88	"
H_2O	12·10	"
Total	99·87	"

DIFFUSION OF ACIDS AND BASES INTO ONE ANOTHER.[1]

By J. Stefan.

When very dilute ammonia is placed over a column of dilute hydrochloric acid, the surface of separation between the acid and the alkaline liquids remains well defined, as can be easily observed if the solutions are colored with litmus, but the region occupied by the acid gradually extends upwards. In one experiment, a solution containing 1 gram-molecule of hydrochloric acid per litre was covered with a solution of ammonia containing one-sixteenth of a gram-molecule; the surface of separation rose 8·2, 16·5, and 24·5 mm. in one, four, and nine hours respectively, the rise being proportional to the square root of the time during which diffusion takes place. With the same hydrochloric acid, employing a solution of ammonia containing $\frac{1}{4}$ gram-mol., the surface of separation rose 5, 9·9, and 14·7 mm. in one, four, and nine hours respectively.

When a solution containing 1 gram-mol. of ammonia is employed, the region occupied by the acid extends upwards, rising 1·2, 2·3, and 3·5 mm. in one, four, and nine hours respectively, but when the ammonia is four times as concentrated, the surface of separation gradually sinks, and the depression is 1·2, 2·5, and 3·8mm. in one, four, and nine hours respectively. If ammonia of a certain concentration were employed, the surface of separation would remain stationary. The concentration of the ammonia which would fulfil this condition would lie somewhere between that of the solutions employed in the last two experiments; the exact strength cannot be ascertained experimentally except with great difficulty, but it can be shown mathematically that the surface of separation would remain stationary if solutions of 1 mol. of hydrochloric acid and 1·8 mol. of ammonia respectively were employed.

The phenomena described above are determined by the relative concentrations of the acid and alkaline solutions; they are independent of their absolute values, at any rate as long as the latter are not very large.

Similar experiments were made with solutions containing 2 gram-mols. of hydrochloric acid and 0·5 gram-mol. of ammonia respectively. The region occupied by the acid extended 5, 9·9, and 14·8 mm. upwards in one, four, and nine hours' time.

---

[1] *Monatsh.*, x, 201–219; reprinted from *Jour. Chem. Soc.*, 1889, p. 1046.

When the hydrochloric acid solution contains only $\frac{1}{16}$ gram-mol., and the ammonia 1 mol., the surface of separation falls 3·9, 8·2, and 11·9 mm. in one, four, and nine hours respectively; with solutions containing 1·5 gram-mol. of hydrochloric acid and 12 gram-mols. of ammonia respectively, the surface of separation falls 3·9, 8·4, and 11·6 mm. in the same times. In those experiments in which the region occupied by the ammoniacal liquid extends downwards, the two solutions do not remain so sharply separated, and the surface of separation is often irregular.

In one experiment with solutions containing 1 gram-mol. of soda and $\frac{1}{16}$ gram-mol. of acetic acid respectively, the region occupied by the alkaline liquid extended 5·8, 11·6, and 17·4 mm. upwards in one, four, and nine hours, and 28·5, 40·5, and 39·7 mm. in one, two, and three days respectively.

The apparatus employed in these experiments consists of two graduated glass tubes (120 mm. in length, 7 mm. in internal and 23 mm. external diameter), fixed, with their open ends turned towards each other, on a perpendicular brass stand, so that they can be moved up and down or rotated round the stand. The open ends have ground edges, the other extremities being closed with glass plates, fastened on with cement. The underneath tube is filled *in situ;* the other is filled, then inverted, and any liquid which falls out replaced with a small pipette. At the commencement of the experiment the open ends of the two tubes are brought to the same level, and they are then rotated until the one is exactly over the other.

The author discusses the phenomena of diffusion mathematically, and, from the data given above, the coefficient of diffusion of ammonia is found to be 0·92, and that of hydrochloric acid 3·02.

From observations made in a similar manner with ammonia and various acids, the diffusion coefficients are found to be as follows:—Nitric acid, 2·93; sulphuric acid, 1·82; oxalic acid, 1·14; and acetic acid, 0·88. In all the experiments, solutions containing one equivalent of the acid and $\frac{1}{16}$ of an equivalent of ammonia respectively were employed. In two experiments in which solutions of one equivalent of base and $\frac{1}{16}$ of an equivalent of acetic acid were employed, the diffusion coefficient of potash was found to be 0·73, and that of soda 1·57. The above values are for the temperature of 21°.

The diffusion coefficients of hydrochloric acid, nitric acid, and sulphuric acid are considerably larger than those found by Scheffer (*Zeit.*

physikal. Chem., ii, 390–404) by the ordinary methods, but the results are not comparable, as Scheffer experimented at lower temperatures; the coefficients found for the other substances agree better, and in some cases very well. The diffusion coefficients found for the three acids named above, and those of potash and soda, are in the same ratio as the molecular conductivities of these electrolytes as determined by Kohlrausch; but the coefficients of oxalic acid, acetic acid, and ammonia are larger than they should be if they followed the same rule. The diffusion coefficients, and those values which are termed the coefficients of chemical affinity, also stand in a direct relation to one another.

ON SOME SODIUM AND MANGANESE COMPOUNDS.[1]

MANUFACTURE OF SODIUM SULPHIDE.

Sodium sulphide is generally made either by double decomposition or by reduction of sodium sulphate. The former process was described by W. Weldon. Another process of double decomposition is that of barium sulphide and sodium sulphate, but this process is only practicable where there is a ready sale for barium sulphate as "blanc fixe." As regards the reduction of sodium sulphate, this article is ground to a coarse powder, mixed with coal-dust in the proportion of 3 to 2, and the mixture heated in a reverbatory furnace. The furnace is 6 meters long, 2 meters wide, 1·7 meters high, and well lined with fire-brick. The bed is divided into two portions, that next to the fire-bridge for the reduction, and the other for the preliminary heating of the charge, which may consist of 150 kilos. of sodium sulphate and 100 kilos. of coal. About 1¾ hours are required for the reduction of this charge. At the end of the operation the fluxed mass is run into iron boxes which are well closed, in order to prevent oxidation. Perhaps a revolving furnace may yet be employed for the reduction, although a few experiments in this direction gave unsatisfactory results. The mass obtained from the furnace weighs about 110 to 115 kilos., and contains up to 60 per cent. of sodium sulphide. Its appearance should be red and porous, but not gray and dense. The cooled mass is broken up into large balls, and thrown into lixiviating vats, arranged and fitted on the same principle as black-ash vats. The lixiviation is performed with warm water, and the liquor running from the strongest vat stands at 32° B. It is allowed to settle for an hour or so, and afterwards run into shallow iron crystallizing pans, where, after four or five days, a copious crop of yellow or brown crystals is formed having the formula Na_2S+9H_2O. The mother-liquor is siphoned off and again boiled down to 31°B. for further crystallization. The large crystals formed are broken up, allowed to drain, and ultimately jigged in a centrifugal machine, whereby they obtain a lighter appearance. Dark crystals are washed with light concentrated liquor, which improves their appearance. The salts obtained during the concentration of the liquors, owing to their oxidation, are employed in the furnace in the place of sodium sulphate.

---

[1] *Jour. Soc. Chem. Ind.; Oil, Paint and Drug Reporter.*

MANUFACTURE OF SODIUM NITRITE.

Sodium nitrite is one of the most important chemicals used in the manufacture of azo dyes. There exist several methods for its manufacture, all of which are based on the reduction of sodium nitrate by means of lead. For this purpose the latter is fused and poured on iron plates in thin layers. After cooling, the lead plates are rolled up, and weighed out in parcels for use. The lead should be free from zinc and antimony. The sodium nitrate is then fused in shallow cast-iron pans fitted with a mechanical agitator, and when the mass is thoroughly fused, two and a half parts of lead are added at short intervals for each part of sodium nitrate (95–96 per cent. $NaNO_3$). The reduction ensues immediately. The thin leaves of lead fuse easily, and are oxidized to yellow lead oxide (litharge). After some time a further amount of lead is added, as an excess of lead is necessary, and the agitation of the fused mass is continued for at least three-quarters of an hour, in order to obtain a product of high strength. The mass has a tendency to stick to the sides, and great care must be exercised to remove these crusts with an iron spatula, as the slightest inattention causes the burning through of the pan. If the crusts turn reddish, it is a certain sign that the pan is in great danger of being destroyed. These crusts must at once be covered by a fresh quantity of nitrate, and the fire withdrawn if necessary. The whole process of fusion is finished in about 3½ hours. A sample drawn should test at least 90 per cent. of sodium nitrite. The mass after cooling is lixiviated in wrought-iron tanks with water or weak liquor. As soon as the solution stands at 36° to 38° B. it is siphoned off and neutralized with nitric acid of 1·029 specific gravity. The liquor is then concentrated to 42° or 43° B., allowed to clarify for three or four hours, and ultimately run into lead-lined wooden tanks. Crystals of a light yellow color quickly make their appearance, which are deprived of their adherent moisture in the customary manner. The mother liquor, in conjunction with other liquors, is again boiled down to crystallization. In this way crystals are obtained of the following percentage:—

	$NaNO_2$ Per cent.
1st crystallization	95·5 to 95·5
2d crystallization	94·8 to 95·5
3d crystallization	94·2 to 94·5
4th crystallization	94·0 to 94·2

By drying at 60° C. their percentage is increased to 96 per cent. If a purer product be required, it must be recrystallized. Some difficulty is experienced in working up the mother liquors. If crystals of only 94 per cent. of $NaNO_2$, or below that strength, be obtained, the mother liquors must be concentrated by themselves in pan No. 2. Here crystals containing 86 to 92 per cent. of $NaNO_2$ are produced, which are employed for enriching the strength of fresh liquors. If the crystals from pan No. 2 sink below 80 per cent. their mother liquors must be concentrated separately in pan No. 3, whereby crystals containing 50 to 75 per cent. of $NaNO_2$ are obtained. These serve for enriching the liquors in pan No. 2. Weaker crystals are returned to the melting pot and treated with lead. Nevertheless, it is sometimes difficult to avoid the formation of salts, which require a special treatment in every case.

The lead oxide, obtained as a by-product, is washed, and afterwards converted into the different lead preparations of commerce, or reduced to metallic lead, when it returns to the process.

ACTION OF AIR ON MANGANESE CARBONATE.

At the ordinary temperature carbonate of manganese, whether native, precipitated, or crystallized from solution in carbonic acid water, is oxidized with difficulty whether exposed to air or to aerated water. In the most favorable case—the precipitated carbonate kept for ten years in aerated water—the proportion of oxygen combined was only that required to form MnO_2MnO. The same compound, produced by directly combining an equivalent of hydrated manganese dioxide with one of hydrated manganese monoxide, does not absorb any additional oxygen, even after five months' exposure to air or water. Manganite, MnO_2MnO, is then the limit of oxidation at the ordinary temperature. At 100°, however, and still more at 200°, the carbonate, the protoxide and the sesquioxide readily undergo oxidation beyond this point, and may be perhaps completely converted into dioxide. The author concludes, in the absence of any analyses showing the native dioxide of manganese to have been produced from the carbonate, that such has not been the case.

FORMATION OF HYDROGEN PEROXIDE FROM PERSULPHURIC ACID.[1]

By M. Traube.

To determine whether oxalic acid is oxidized by persulphuric acid (SO_4) in 70 per cent. sulphuric acid solution as stated by Richarz (*Ber.* xxi, 1670), the author added a known quantity of oxalic acid, dissolved in 70 per cent. sulphuric acid, to 70 per cent. sulphuric acid containing a known quantity of persulphuric acid, and passed a stream of air, free from carbonic anhydride, through the mixture for three hours; not a trace of carbonic anhydride was evolved. The mixture was then made up to 100 cc. with 70 per cent. sulphuric acid, and (1) the quantity of oxalic acid, (2) the total available oxygen, (3) the available oxygen in the hydrogen peroxide, and (4) the available oxygen in the persulphuric acid determined. The results showed that oxalic acid is not acted on by persulphuric acid in presence of 70 per cent. sulphuric acid, and that, in the first two or three hours, more than two-thirds of the persulphuric acid is decomposed, and its available oxygen almost completely converted into hydrogen peroxide. When the experiments described above occupied more than two or three hours carbonic anhydride was evolved, owing to the oxidation of the oxalic acid by the hydrogen peroxide; at low temperatures (8–10°), however, the evolution of carbonic oxide was very slight.

It was proved by similar experiments that carbonic oxide is not oxidized by a 70 per cent. sulphuric acid solution of persulphuric acid, and that within 3½ hours, more than two-thirds of the available oxygen is converted into hydrogen peroxide. As, therefore, persulphuric acid is such a feeble oxidizing agent, it cannot be true that it oxidizes water, as is stated by Richarz (*loc. cit.*).

When a 40 per cent. sulphuric acid solution (20 cc.) of persulphuric acid (= 16 milligrams of the available oxygen), free from hydrogen peroxide, is diluted with water, neutralized with barium carbonate, and filtered, the filtrate contains hydrogen peroxide (= 7·4 milligrams of available oxygen); this experiment shows that Richarz's view (*loc. cit.*) that hydrogen peroxide is only formed from persulphuric acid in 70 per cent. sulphuric acid solution, is untenable.

---

[1] *Berichte*, xxii, 1518–1528; reprinted from *Jour. Chem. Society*, 1889, p. 940.

Violet chromic sulphate is not oxidized to chromic acid by a 40 per cent. sulphuric acid solution of persulphuric acid; when chromic acid is treated with persulphuric acid in 70 per cent. sulphuric acid solution, it is reduced to chromic oxide in consequence of the formation of hydrogen peroxide.

Persulphuric acid also differs from other powerful oxidizing agents in this. that in 70 per cent. sulphuric acid solution it does not decompose, but actually gives rise to hydrogen peroxide. Quantitative experiments showed that when hydrogen peroxide and persulphuric acid are present together in 40 per cent. sulphuric acid solution, they are both very slowly decomposed, equal molecules of the two compounds being destroyed, but a similar solution of either compound alone undergoes no considerable change within 48 hours.

Persulphuric acid does not act on organic compounds, or has, at the most, only a very slight action. In 40 per cent. sulphuric acid solution, it does not decolorize indigosulphonic acid until after half an hour's time, and a solution in dilute sulphuric acid (about 10 per cent.) can be filtered through paper without any reduction taking place. Neutral solutions of persulphuric acid are only very slowly reduced by alcohol, but arsenious acid is completely oxidized within a short time. Berthelot (1878,) has stated that arsenious acid is not acted on by persulphuric acid.

The following reactions show that persulphuric acid belongs to the class of oxygen molecule compounds (holoxides). Platinum, either in the form of wire or as platinum black, decomposes persulphuric acid with evolution of oxygen, but only in the presence of acid. A neutral or slightly acid solution of persulphuric acid oxidizes indigosulphonic acid only slowly, but immediately on adding ferrous sulphate. Persulphuric acid and hydrogen peroxide, when present together, behave like two holoxides. Persulphuric acid sometimes behaves as a reducing agent; a solution of 40 per cent. sulphuric acid, free from hydrogen peroxide, reduces lead peroxide, the hydrate of manganese dioxide, and silver peroxide.

The article concludes with a discussion of the existence of oxygen-molecule compounds, which is principally controversial.

A CONTRIBUTION TO THE DIETETICS OF ALCOHOL.[1]

By Dr. Alexei M. Mohilansky.

In order to study the action produced by an occasional (dietetic) use of alcohol on the nitrogenous metabolism and the assimilation of proteids and fats, Dr. Mohilansky, house physician to Professor V. A. Manasseïn's clinic, has undertaken careful experiments on 15 healthy men (mostly medical students), aged from 18 to 28. Some of the subjects were total abstainers; some were occasional, and others habitual alcohol drinkers. The administration of alcohol varied according to the subject's habit, the daily dose oscillating between 60 and 140 ccm. of absolute alcohol, or from four small wineglassfuls (rïumka) to half-a-bottle of a 40 or 42 per cent. vodka (aquavit). To put it otherwise, the beverage was given in a dose sufficient to produce a slight intoxication (high spirits and talkativeness, etc.). The principal results of Dr. Mohilansky's important and very instructive researches may be given somewhat as follows:—

(1) In habituated people, alcohol, when taken in moderate quantities, distinctly improves appetite and gives rise to a marked increase in the assimilation of the nitrogenous constituents of food, the average surplus amounting to 2·09 per cent., the maximal to 4·22 [*e. g.*, a patient who had been assimilating 93·10 per cent. of nitrogen, without alcohol, proved to be assimilating 96·07 per cent. when alcohol was added to his dietary].

(2) In habitual total abstainers, however, the assimilation somewhat sinks (0·28 or 0·33 per cent.).

(3) The increased assimilation in the former category must be attributed to a more complete absorption and intensified gastric digestion, which result from a prolonged retention of food in the stomach, on one side, and from increased digestive power and secretion of the gastric juice (Claude Bernard, Kretschy, Richet, Lever, Petit et Sémerie, Glucinski).

(4) The nitrogenous metabolism, or disintegration of systemic proteids, almost invariably (in 13 out of 15 cases) decreases, the average fall being 8·73 per cent., the maximal 19·42, the minimal 0·14 [*e. g.*, in a patient in whom the metamorphosis in non-alcoholic days had amounted to 80·11 per cent., in alcoholic ones it fell to 63·78]. The decrease is observed very frequently even when small doses are taken;

---

[1] Condensed from a St. Petersburg Inaugural Dissertation, 1889, by Valerius Idelson; reprinted from *The Medical Chronicle*, November, 1889.

it is invariable in the case of moderate or middle-sized ones. However, there does not exist any strict parallelism between the dose and the amount of the inhibition of the metabolism.

(5) The decrease remains still perceptible for some while, even after discontinuing alcohol.

(6) It is probably dependent mainly upon alcohol inhibiting the systemic oxidation processes (V. A. Manasseïn, Schmiedeberg, Boecker), and further, upon its deviating the blood pressure, dilating blood-vessels, retarding the circulation, and depressing the bodily temperature.

(7) Alcohol also diminishes somewhat the assimilation of fats (to judge from the fact that the amount of fatty acids eliminated with fæces is augmented).

(8) It does not possess any diuretic action; on the contrary, it rather tends to inhibit the elimination of water by the kidney, which after all, should be expected beforehand, since alcohol dilates cutaneous blood-vessels and depresses the arterial tension, that is, favors cutaneous perspiration, and interferes with the renal action. [As a matter of fact, in two patients, the daily amount of the urine remained unaltered; in five, it increased on an average 7 per cent., while in eight it fell 12 per cent.].

(9) Such organs as are not habituated to the use of alcohol show a much stronger reaction towards the substance than habituated ones.

THE RESIN OF MYOPORUM PLATYCARPUM.

By J. H. Maiden, F.L.S., Curator of the Technological Museum, Sydney.

A veritable natural sealing-wax is yielded by a small tree which is found in the interior of Australia; it occurs in the more arid portions of all the colonies except Queensland. The tree is *Myoporum platycarpum*, R. Br., and it possesses a variety of local names, such as "Sandalwood," "Dogwood," and "Sugar tree;" the latter because a manna exudes from it which is greedily sought after by the blacks, and is likewise much appreciated by colonists. It yields a resin, which is used by the aboriginals as a substitute for pitch and wax; for example, they use it either alone, or mixed with fat, to cement the stone heads of their tomahawks to the fibre which joins them to the stick forming the handle. As has been already hinted, it forms a natural sealing-wax, and is sometimes used by people in the interior for this purpose. It would probably serve as a constituent of black sealing-wax; alone it is too soft for keeping in this climate.

It sometimes occurs in great quantities on the stem, is hard and brittle, breaks with a glassy fracture which is at first of a purple or indigo color, but becomes brown on keeping. Often it may be picked up from under the trees in rounded or globular pieces.

Two samples have come into the writer's hands, and a few notes concerning them will doubtless be interesting. The first, from the Lachlan River, New South Wales, is in small rounded lumps usually weathered on the outside, and having a pleasant empyreumatic odor; these are of a dark reddish-brown color, fly with the slightest touch of the pestle, and are easily powdered. The resin has a bright fracture, which appears almost black, but shows reddish-brown at the edges. It softens even with the warmth of the hand, and if kept in a bottle, the heat of an average summer day is sufficient to fuse pieces presenting fresh fractures.

It presents some external resemblance to guaiacum resin (especially when that substance comes to market in small lumps), but it is not so green in color as the latter. It has no taste. Cold water has no effect on it, but if the water be heated the resin melts and floats, forming a liquid much resembling tar, but of a purplish-brown color. The water remains clear, colorless and almost odorless.

Light petroleum dissolves 46·8 per cent. of a reddish-brown resin, destitute of odor. Alcohol dissolves from the residue 28·1 per cent. of a deep reddish-brown resin, which is almost black by reflected light.

The residue was boiled in water and 1·7 per cent. of saline matter was extracted, while 23·4 per cent. of accidental impurity was left behind. This is of a chocolate color, and under a lens was seen to consist of a little ligneous matter, with a large percentage of inorganic impurity. It was quite free from gum.

Summary.

α-Resin soluble in light petroleum	46·8
β- " " alcohol	28·1
Saline matters	1·7
Accidental impurity	23·4
	100·0

The crude resin melts at 90·5°. It contains no tannic acid.

The second sample was procured from Netallie, Wilcannia, New South Wales. It presents no marked points of difference, as regards physical appearance, from the preceding one. On treating it with alcohol, the liquid is not so dark as that yielded by the preceding sample, neither is the color so rich. It resembles tawny port, but is a little darker.

Light petroleum extracts 48·6 per cent. of resin, and alcohol added to the residue extracts 36·4 per cent.—*Journal Chem. Soc.*, 1889, p. 665.

THE TOXIC ACTION OF THE ALBUMOSE FROM THE SEEDS OF ABRUS PRECATORIUS.[1]

By Dr. Sidney Martin.

In a previous communication (see American Journal of Pharmacy, 1887, page 503) the author demonstrated the presence of two proteids in the seeds of the *Abrus precatorius* or jequirity plant —a globulin and an albumose—and also discussed the physiological action of the globulin. The present paper deals with the physiological action of the albumose. The symptoms produced by injecting hypodermically the albumose are increasing weakness, with rapid breathing, without convulsions or paralysis. The post-mortem appearances are local œdema or ecchymosis, and gastro-enteritis with occasionally petechiæ on the serous membranes; the blood usually dark and fluid. When applied directly to the eye the albumose causes severe conjunctivitis and chemosis.

The poisonous action of the albumose is completely destroyed by boiling the solution. Up to 50° C. no effect is produced; at 70° to 75° C. the albumose is still poisonous, but not nearly to so great a degree as previous to heating; at 80° C. a still further diminution in activity is produced. The action of the albumose in producing conjunctivitis is also diminished by heat. It will be seen that there is a great resemblance in chemical composition between the abrus-poison and the toxic principle of snake-venom. Weir Mitchell and Reichert describe the venom of the rattlesnake as consisting of a globulin and a peptone. The latter, however, is not a true peptone, and is probably closely allied to the albumose class of proteids. If the venom of snake poison is heated, its activity is diminished and in some cases destroyed, the globulin being coagulated and the peptone-like body decomposed.

---

[1] *Proc. Royal Society*, vol. xlvi; reprinted from *The Medical Chronicle*, November, 1889.

The results obtained may be thus summarized: The toxic principle of the jequirity resides in two proteids present in the seeds—a para-globulin and an albumose, which practically possess the same toxic properties. The activity of both these proteids is destroyed by moist heat. The snake-venom resembles abrus-poison in chemical composition, in its power of producing local lesions, of reducing body temperature and rendering the blood fluid after death, and to some extent in the effect on it of moist heat. Abrus-poison, however, is much less active than snake-venom. The fatal dose of snake-venom varies according to the species of snake from 0·0021 gm. to 0·000079 gm. per kilo. of body weight, whilst abrus-poison stands at globulin 0·01 gm., albumose 0·06 gm. per kilo. of bodily weight.

BOTANY BAY OR EUCALYPTUS KINO.

By J. H. Maiden, F. L. S., F. C. S., Etc., Curator of the Technological Museum of New South Wales, Sydney.

The first part of the author's interesting paper, published in *Phar. Jour. and Trans.*, September 21, states that in Australia, kinos are largely used in rural medicine, on account of their astringent properties, aqueous solutions being almost invariably made. Some of them are used by the settlers for ink, or for staining leather black, the process simply consisting in boiling the kino in an iron saucepan. The commerce with Europe and America in eucalyptus kino has never been important. A good kino of uniform composition, offered by Mr. Bosisto, is collected from *E. rostrata*.

Wounding the bark stimulates the flow of kino in some cases, but such a practice does not appear to be systematically resorted to. Usually it is collected from the outside, which accounts for its occasional admixture with particles of bark, but sometimes it is contained between the concentric layers of the wood (chiefly in the case of *E. corymbosa*). In the latter case it has communication with the outside of the tree, though frequently the passage is blocked with indurated kino, which has to be removed to enable the store inside to be drawn off.

The eucalypts are popularly known in Australia as "gum trees," but certain species from the structure of their bark are called "iron barks" and "stringybarks." The "gums" are locally distinguished as red, white, blue and by other adjectives. The adjective is in one district employed to describe the leaves, in another the bark, and so on. Thus a "white gum" may be intended to denote a tree with white leaves, white bark, etc. The variations in some trees in different localities, due to climate, soil and similar causes, are sufficient to render terms like "white gum," etc., which may in some way describe a species in one district, totally inapplicable in another.

Classification of Eucalyptus Kinos.—Eucalyptus kinos can be very simply classified according to their behavior with alcohol or water. In all cases the writer made the tinctures of the strength of tinct. kino, B. P. The kinos experimented upon by the writer fall into three groups, which he has called, the Ruby group, the Gummy group, and the Turpid group respectively.

a. Ruby Group:—

E. amygdalina, Labill.
E. eugenioides, Sieb.
E. hæmastoma, Sm.
E. macrorrhyncha, F. v. M.
E. pilularis, Sm.
E. piperita, Sm.
E. Sieberiana, F. v. M. (syn. *E. virgata*, Sieb.).
E. stellulata, Sieb.
E. melliodora, A. Cunn.
E. obliqua, L'Her.

In the preparation of a tincture all the above kinos tend to dissolve entirely, forming clear ruby solutions of approximately the same tint. They also form clear ruby solutions to cold water, hardly differing in appearance from the tinctures. The aqueous solution of the alcoholic extract is similar in appearance. Members of this group are not very friable, breaking down into clean angular fragments, and never forming an impalpable powder. If acetate of lead or of copper be added to a moderately strong solution of these kinos, so strongly gelatinous a precipitate will be formed that the test-tube may be inverted without any liquid spilling. This distinguishes them, in one respect, from the Turbid Group.

At present I know of no constant characteristics to aid in further sub-dividing this group. The stringy barks (*E. obliqua, macrorrhyncha*, etc.) may often be distinguished (as a group) by means of fibrous bark either attaching to individual fragments of kino, or loose with a parcel of it, but it must be borne in mind that many other species (*e. g., piperita*) have more or less stringy bark.

b. Gummy Group:—

E. leucoxylon, F. v. M.
E. paniculata, Sm.
E. resinifera, Sm.
E. robusta, Sm.
E. saligna, Sm.
E. siderophloia, Benth.

In spirit, these kinos scarcely dissolve, leaving abundant granular residue of gum. Supernatant liquid perfectly clear. These kinos tend to be perfectly soluble in cold water, and age seems to have but little effect on them in this respect. They are like the Ruby kinos in not forming impalpable powders, being even tougher than the members of that group. They form gelatinous precipitates with some metallic acetates, like the Ruby group.

c. *Turbid Group:*—

E. goniocalyx, F. v. M.
E. hemiphloia, F. v. M.
E. rostrata, Schl.
E. punctata, DC.
E. odorata, Behr.
E. Gunnii, Hook.
E. Stuartiana, F. v. M.
E. viminalis, Labill.
E. terminalis, F. v. M.
Angophora lanceolata, Cav.
A. intermedia, DC.

The above yield orange-brown solutions.

E. corymbosa, Sm., yields solutions up to the brightest ruby.

E. microcorys, F. v. M., and *E. maculata,* Hook., yield solutions of various shades, from lemon-yellow to orange-brown.

All the members of this group yield turbid solutions to spirit, which require long standing or filtering to become clear. They behave in a similar manner to water, but become clear on boiling, indicating catechin. The aqueous solutions of the alcoholic extract are likewise turbid. They are all more or less friable, forming impalpable powders usually by pressure of the fingers. Addition of acetate of lead or copper produces only a very slight gelatinous precipitate, thus dividing them from the other two groups.

Sub-division of the Group.—*E. corymbosa* kino is usually so brilliant in color, and yields such rich-colored tinctures that it cannot well be mistaken for any other kino.

E. microcorys and *E. maculata* are often externally much alike, but they may be distinguished (1) by the facility with which the former dissolves in water, (2) by the yellow color which the latter yields to ether.

E. maculata, E. punctata and *A. lanceolata* possess odors. The essential oils which cause them may be removed by ether.

Definition of the terms "Botany Bay Kino" or "Australian Kino." Not the product of E. resinifera.—I propose to investigate the claim of certain species to be yielders of the kino which for over one hundred years has passed under one or other of the above names. The first published allusion to this kino will be found at p. 233, *Journal of a*

Voyage to New South Wales, by John White, Esq., Surgeon-General to the Settlement, London, 1790. A plant is figured (flower-buds and bark), described by Dr. (afterwards Sir) James Smith, who wrote the botanical portion of White's book, as a new species, *Eucalyptus resinifera*, and the kino is thus alluded to:—"On making incisions in the trunk of this tree, large quantities of red resinous juice are obtained,' sometimes even more than 60 gallons from a single tree. When this juice is dried, it becomes a very powerfully astringent gum-resin, of a red color, much resembling that known in the shops by the name of kino, and for all medical purposes fully as efficacious. Mr. White administered it to a great number of patients in the dysentery which prevailed much soon after the landing of the convicts, and in no single instance found it to fail. This gum resin dissolves almost entirely in spirit of wine, to which it gives a blood-red tincture. Water dissolves about one-sixth part only, and the watery solution is of a bright red. Both these solutions are powerfully astringent." What particular tree is indicated in the above passage will probably never be known. The sample of bark figured is smooth and scribbly, like that of *E. hœemastoma* perhaps, and certainly as unlike that of the two trees named by Sir James Smith and Allan Cunningham, *E. resinifera*[1] (*vide infra*), as it is possible for it to be. Only two trees in the Sydney district yield kino in anything like the abundance it was alleged to have been yielded by the *E. resinifera* of Smith. They are *E. corymbosa* and *Angophora intermedia*, but although I am well acquainted with these trees, and have made the matter of exudations of our native trees my special observation for over three years, the highest reliable estimate of the quantity yielded by either of them would not be more than one-third of the quantity mentioned by White. The red color would, however, exclude the *Angophora*, while *E. corymbosa* yields a "blood-red tincture" to spirit of wine, and dissolves almost entirely in that liquid, but such a kino would be readily and almost entirely soluble in cold water. Smith's description also contains the statement: "The wood is extremely brittle, and from the large quantity of resinous gum it contains is of little use but for firewood." Not too much stress should be laid upon an expression of opinion of the value of a timber made only a few months after the settlement of this continent, but the description of the wood being full of gum-resins almost certainly applies to *E. corymbosa,* or to an *Angophora.* But the flower-buds figured are of a eucalypt (and that excludes *Angophora*), while they are as unlike those of *E. corymbosa* as possible. The bark figured is smooth, the flower-buds have something the shape of those of *E. punctata* (included by Bentham under Smith's *resinifera*), while the strongly-compressed peduncle, all taken in conjunction with the smooth bark (*E. resinifera* bark is never smooth, except occasionally on the branches), may show that Smith's figures refer to *E. punctata.* But the kino of *E. punctata* is liver colored or reddish-brown, and that description does not tally with that of White. All this tends to prove the truth of my original assertion, that the origin of the figures in White's book will probably never be known. As likely as not the bark and the flower-buds (no other parts being figured) were from different species.

---

[1] *E. punctata* (included in *E. resinifera*) has a smoothish bark, but is not scribbly.

It will be seen later on that the name *resinifera* was a singularly unfortunate one to apply to any species of eucalyptus, firstly, because they are nearly free from resin, and secondly, because scores of species yield this exudation (called "gum resin" by Smith) very freely. All kinos yielded by eucalypts, if they have been exuded sufficiently long, will be found, at a certain stage, to be only soluble in water to the extent of one-sixth, but a eucalyptus kino almost entirely soluble in spirit, and at the same time only one-sixth in water, is an impossibility.

White's description (for although penned by Smith, the substance of it must have been supplied by White) has partly been copied by many subsequent authors. A few extracts will suffice.

"*E. resinifera,* the brown gum tree of New Holland, furnishes Botany Bay kino. A single tree will yield 60 gallons." Balfour, "Manual of Botany." *E. robusta* is the only eucalypt ever known as "brown gum," but that species neither exudes kino freely, nor is the product readily soluble in spirit.

"*Botany Bay Kino.*—The substance called by this name is the produce of *Eucalyptus resinifera* (Myrtaceæ), and other species of eucalyptus, natives of Australia and Tasmania. It appears to be a kind of extract, and has properties similar to the official kino." (Pereira, "Materia Medica"). The surmise as to its being an extract has already been dealt with.

"*E. resinifera,* the Ironbark tree, a native of Australia and Van Diemen's Land, and several other species, yield an astringent substance called eucalyptus, or Botany Bay kino. The kino resembles in its properties the official catechu and kino, and may be used for a similar purpose." (Bentley, "Manual of Botany"). The Ironbark tree above alluded to is the *E. resinifera* of A. Cunn. (*E. siderophloia*, Benth.), but neither it nor the *E. resinifera* of Smith extends to Tasmania.

As has already been mentioned, there are two eucalypts called *E. resinifera*. They are :—

1. *E. resinifera*, Smith (White's "Voyages," p. 233; "B. Fl.," iii, 245; figured in Decade I. of Mueller's "Eucalyptographia"). It is commonly called "Red or Forest Mahogany," and is the tree to which the species-name attaches by priority.

2. *E. resinifera*, A. Cunn. (Syn., *E. siderophloia*, Benth.); "B. Fl.," iii, 220. Figured in Dec. IV. of Mueller's "Eucalyptographia."

"*Ironbark*" *or* "*Red Ironbark*."—At the latter place Baron Mueller states, "The Rev. Dr. Woolls observes that the Botany Bay kino is more extensively obtained from *E. siderophloia* than from *E. resinifera* (Smith, of course), which, as the specific name implies, is generally regarded as the main or even sole source of that drug." And Dr. Woolls, in his "Plants of New South Wales," (1885), states, "The Botany Bay kino was procured principally from this species, and hence Allan Cunningham and other botanists were accustomed to call it *E. resinifera*."

But what are the characteristics of kino? The official kino (*Pterocarpus Marsupium*) is, according to the British Pharmacopœia of 1885, "almost entirely soluble in rectified spirit." This is an important property, and on it the tinct. kino B. P. is based. Works on materia medica, while pointing out certain unimportant points of dissimilarity between the official and eucalyptus kino, never state that the latter does not dissolve in rectified spirit, while some make the specific statement that it is soluble in that liquid. But my experiments have shown that no kino is more insoluble in spirit than that of *E. siderophloia*. I obtained four samples from widely different localities in New South Wales and Queensland, and collected at different times. They all agree in their very partial solubility in alcohol, by reason of the very high percentage of gum they contain. The *E. resinifera* of Smith is also comparatively little soluble in spirit, for a similar reason. For this reason alone, I do not hesitate to say that "Botany Bay kino" is neither the produce of *E. resinifera*, Smith, nor *E. resinifera* A. Cunn. Both these kinos would be quite useless for the preparation of a tincture, and would never be thought of a second time by any person who had made the experiment on either; it is therefore quite certain that these species have not caused pharmacists to use eucalyptus kino more or less for a century, but rather, it has doubtless been the admixture of such kinos as these with such eucalyptus kinos as are freely soluble in spirit, which has helped to bring eucalyptus kino into disrepute.

I now give a list of species which satisfy the requirements of the B. P., and it is hoped that systematic endeavors will be made to place kinos, which do, or should come into that list on the market. Eucalyptus kino was official in the Edinburgh Dispensatory of 1811, but the different substances supplied under the same name doubtless led to its omission.

1. All members of the Ruby group.
2. The following members of the Turbid group:

E. goniocalyx, *E. hemiphloia*, *E. rostrata*, *E punctata*, *E. odorata*, *E. Gunnii*, *E. Stuartiana*, *E. viminalis*, *E. terminalis*, E. *corymbosa*.

The remaining members of the turbid group in my list must be for the present omitted, on account of their color; perhaps *E. punctata* would have to be rejected only on that account.

All members of the gummy group must be rejected.

Important Note.—The above list only contains those species which I have proved by experiment to be suitable. I can therefore guarantee them, and will only add others to the list as opportunities occur for testing them by other chemists or myself.

I suppose it is too much to expect that the specific name of *resinifera* shall be abandoned for any eucalypt. I know it is against botanical rules; but if the specific name *virgata* could be suppressed on account of the stature of a eucalypt, I think, on the ground of expediency, Baron Mueller may well suppress Smith's *E. resinifera*,[1] for this name has impeded attempts to obtain a knowledge of our kinos for a century. I have already specifically referred to two objections to the use of *E. resinifera* for Smith's species, and would now emphasize that it is a poor yielder of a poor kino. Out of nearly one hundred and fifty species of eucalyptus, most of them (perhaps all) yield it more or less, and of those which yield it most abundantly it is difficult to say which produces it the most freely, and to which the term "resinifera" would by right belong. Probably to *E. corymbosa*. But the name should be suppressed.

---

[1] Another eucalyptus is usually called by a false name, the essential oils being generally labelled *E. Globulus*.

Gelatinization of Tincture of Kino.—The gelatinization of tincture of kino, by which it forms a substance like red-currant jelly, and more or less devoid of astringency, remains an unsettled question, although it has often been alluded to in journals devoted to pharmacy[1] during the last half century. Pereira following Thomson, and most other writers on materia medica following Pereira, state that where gelatinization takes place, "Botany Bay Kino" has been used, by which is meant, as I have already shown, any of the kinos belonging to perhaps 40 or 50 species.

I have had over seventy eucalyptus and angophora kinos in spirit (to make tinctures of B. P. strength), for periods varying from a few days to twelve months, and have drawn the following conclusions:—(1) Tinctures do not gelatinize if made from new kinos. By the word "new" I mean under one or two years old. (2) No kinos gelatinize other than the clear ruby ones. Five very old ruby kinos on which I experimented gelatinized in a month or two, (3) All kinos entirely soluble in spirit are ruby ones.

Whatever the cause of gelatinization may be, or rather, whatever the substance may be which, when formed, causes gelatinization, my experiments show that no chemist need have gelatinized tincture of kino if he chooses to avoid it. Old ruby kinos should be rejected for the purpose of tincture making. In the case of a member of the Ruby group, if the kino is not completely and readily soluble in cold water, forming a clear ruby solution, with no gelatinous ruby-colored residue of phlobaphene, it should be rejected. My tinctures were made in March, 1888, and perhaps sufficient time has not elapsed to justify one in being dogmatic on the matter, but I will engage to report these samples in another year or two.

The writer has little doubt that this gelatinous looking mass consists wholly or mainly of softened phlobaphenes. By direct experiment he has shown that insoluble phlobaphenes break down after a longer or shorter period of digestion in alcohol, and form the substance already likened to red-currant jelly. The subject will bear further inquiry, but certainly he cannot detect gum, or the somewhat unsatisfactory pectin in the gelatinized mass.—*Phar. Jour. and Trans.*, October 26, 1889.

---

[1] Cf. *Pharm. Journ.*, i, 399; [3], x, 232.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, November 19th, 1889.

The meeting was called to order and Mr. W. B. Webb asked to preside. On motion the reading of the minutes was dispensed with.

The registrar exhibited a *pipette* designed so as to prevent the mixing of liquids which were to be brought together in testing; the line of union of the two liquids could then be distinctly seen by the color occurring at the point of contact. The end of the pipette was curved to a horizontal line so the flow would take place over and not through the lower liquid.

A paper upon *tar* by Mr. R. G. Dunwody, of the present class, was read by him and referred. During the discussion the difference noticed between the tar obtained direct from North Carolina and that refined here for the use of the drug trade was attempted to be accounted for; that tar has a peculiar granular character has long been known and it is nowhere better shown than in *tar ointment;* Mr. J. W. England said, as made by the officinal process of equal parts of tar and suet it inevitably passed into that condition. He found an excellent preventive of that change in the addition of 12·5 per cent. of yellow wax, reducing the suet to 37·5 per cent In detail the pharmacopœia process was followed. Mr. Webb corroborated this statement and said he used wax in the proportion of 8·5 per cent. with satisfaction. Mr. McIntyre asked why the commercial tar should be refined, that as formerly supplied it was satisfactory; it was stated that Mr. Good thought it necessary because sticks, chips, sand and clay were often found in it. The result seems to be that refined tar is not as desirable as the old-fashioned article was. This, Professor Trimble thought, was owing to the process destroying the pyrocatechin and abietinic acid which are components of true tar. Gas or coal tar if added to tar would, it was thought, destroy both these compounds. It was asked if pyroligneous acid would not also destroy these principles. Professor Trimble thought it would. Dr. Lowe said that Mr. Good's statement that coal tar was not added to that he refined was sufficient, and further he thought coal tar more valuable than wood tar, therefore it would not be used as an adulterant.

Mr. G. M. Beringer read a paper upon the *oleates,* tracing their medical history and giving formulas for the preparation of oleates of zinc, lead, copper, mercury and bismuth. The chairman expressed his gratification with the paper; it was characterized by so much painstaking work. Mr. Boring moved a vote of thanks to the author, and said that he regarded the paper as valuable to all who wished to work in the same line. The chairman inquired if the use of oleates was as large as formerly. Several stated they had seen great advantage from their employment. Mr. Brown said they used a good deal in Cooper Hospital, Camden, N. J.

Professor Maisch asked what was the source of the oleic acid used in these experiments, and referring to the instability of oleates of mercury as ordinarily prepared, suggested that this might possibly be due to the oleic acid used being of vegetable origin, which, according to recent investigations, would always contain some linoleic acid, a compound very prone to oxidize. Mr. Beringer said that the red oil of the candle-makers, purified, had been used; that the iodine number of linoleic acid was very high, and that from this test he judged that the acid was from animal sources, but he could not speak positively.

Some samples of *saffron* were brought to the attention of the meeting, and in a paper read by Mr. Beringer one sample was described as being adulterated with a kind of grass, stained with some coloring-matter, most probably a coal oil color, and weighted with sulphate of calcium, and the other sample to be adulterated with sulphate of sodium. Professor Maisch said these examinations showed that those who followed the trade of adulterating this drug were choosing new substances for sophistication; that while the inorganic salts could be detected by incinerating the drug and testing the ash, if ammonia salts should be used they would be volatilized and therefore not so easily detected. Professor Maisch went on to say that he thought if the dealers who purchased it at first hands from the producers were willing to pay a sufficient price the true saffron could be had without difficulty; that the saffron produced for home use only in Pennsylvania in Lancaster and Lebanon counties is equal to any and that any surplus not needed by the producers was sold for its weight in silver.

Mr. Isaac Cohen, one of our graduates, presented to the meeting some samples of *extract of beef* prepared by Armour & Co., of Chicago. Their claim is that it contains all the albuminoids of beef with the nutrient properties unimpaired, that no chemicals are added, save a portion of chloride of sodium, to render it permanent. Professor Trimble inquired whether the extract was soluble in wine so as to be suitable for making the beef, wine and iron of pharmacy. The reply was that it was suitable for that purpose if a weak sherry was used; that it had been used in Cincinnati in the hospitals there with satisfaction. Mr. Boring wanted to know if the process was secret, whether the apothecary could make it himself in his store. It was stated in reply that the manufacture was not secret, but that the process was not suitable to the facilities of a drug store, as it needed vacuum apparatus and must be performed on a large scale to be economically done.

Mr. McIntyre inquired if any one could say whether the commercial *pills* requiring *aconite extract* were made with extract of aconite root or leaves. The reply was that the dose generally would indicate which, but in the case of Gross' neuralgic pill, which was mentioned, that the English extract of aconite leaf was used. This query lead to discussion, which showed how it was that aconitine was dismissed from the pharmacopœia, as the crystalline alkaloid was so much stronger than the amorphous, that the doses formerly employed of amorphous aconitine would be positively dangerous if the crystalline alkaloid were used.

Professor Maisch stated this was also true of digitalin.

The registrar stated that a paper upon the division of powders in prescriptions was published in the August number of the AMERICAN JOURNAL OF PHARMACY, and a tile was described for facilitating the work. Mr. J. S. Mack, of Slatington, a member of the present class, made a couple of them of slate, with the divisions and figures enamelled on them; these tiles were exhibited to the meeting.

On motion adjourned.

THOS. S. WIEGAND,
Registrar.

EDITORIAL DEPARTMENT.

Commercial Interests.—The Secretary of the Section of Commercial Interests of the American Pharmaceutical Association has announced that the Executive Committee of the Section desires to receive copies of all reports relating on matters of commercial interests, which may have been made to either State or local pharmaceutical associations. Correspondence on these topics should be addressed to F. B. Kilmer, New Brunswick, N. J.

Montreal College of Pharmacy.—From a circular issued by the executive officers of the college we learn that by the laws of the Province of Quebec all licentiates in pharmacy must, before obtaining their licenses, take five courses of lectures, two each on materia medica and chemistry, and one on botany. These laws, passed fourteen years ago, compelled the establishment of the Montreal College of Pharmacy, as none of the medical colleges could furnish the required courses. The college has been kept going by aid from time to time from the city trade, both wholesale and retail, and, as its fee for entrance was a nominal one of two dollars, and the professors were paid directly by the students, it had no chance to extend its sphere of usefulness, but had to be content merely to enable its students to comply with the laws. Since its foundation, over 120 licentiates have graduated, many of whom are scattered over this continent doing good work for pharmacy, and it has at present 60 students on the roll.

The college, aiming to keep abreast with the age, finds its main need to be a proper home, and to meet this, the Board have been actively working, with the result that negotiations are being held for the purchase of a well-situated property on St. Catharine street, which can be readily adapted to college purposes. The sum of $10,000 is required to purchase this, and make needful alterations. Proper and modern equipments are also wanted in the laboratories, class rooms and library, to aid the students successfully to master the daily widening field of studies in connection with their profession. Committees have been canvassing the Montreal pharmacists, and have met with so much success, over $3,500 being promised, that the Board feel encouraged to persevere in their efforts to give the Montreal College of Pharmacy a home of its own. Subscriptions will be thankfully received, and can be sent to Mr. A. Manson, Treasurer, 37 Recollet street, who is authorized to receive them.

Early Closing.—Under the stimulus of sharp competition a number of pharmacists in our larger cities have found it necessary and profitable to keep their places of business open day and night. In the majority of these stores it is probably not so much a strictly pharmaceutical business, but rather the sale of accessories which are generally kept on hand, that enable this extension of business hours to be carried on without pecuniary loss, or even with actual profit. The curtailing of business hours by early closing in the evening, and limiting the Sunday labor to stated hours, which measures have been frequently agitated in past years, has, in the main, been unsuccessful in our large cities. It will be of interest to learn that in the city of Stuttgart, Germany, which, in 1885, had 126,000 inhabitants, all the pharmacies are closed at nine o'clock in the evening since October 1st. As a matter of course, provision has been made for proper night service; but thus far the experience has been that between the hours of nine and ten the services of the night clerks have been very rarely required, the public generally approving of the earlier closing.

The Louisville Medical Herald has a "Pharmaceutical Department" which has been in charge of and ably conducted by Mr. J. W. Fowler, who now announces that his other duties have been augmented by one of such paramount importance as to compel him to relinquish the editorial chair. The retiring editor has done good work while in charge of the publication indicated, and we trust that, though retiring from editorial labors, he may still find time and occasion for giving the influence of his pen to the cause of pharmacy.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

The Practice of Pharmacy. A treatise on the modes of making and dispensing officinal, unofficinal and extemporaneous preparations, with descriptions of their properties, uses and doses; intended as a hand-book for pharmacists and physicians and a text book for students. Second edition; enlarged and thoroughly revised. By Joseph P. Remington, Ph.M., F.C.S., Professor of Theory and Practice of Pharmacy, and Director of the Pharmaceutical Laboratory in the Philadelphia College of Pharmacy. With over six hundred illustrations. Philadelphia: J. B. Lippincott Company, 1889. 8vo, pp. 1,300. Price in cloth, $6.00.

We are pleased to announce the publication of the second edition of this work, which makes its appearance four years after the first edition was noticed in this journal. The value of the work was then pointed out, and what was then said about it remains good also for the present edition, which in its general plan and arrangement remains unaltered, but as compared with the former has been increased in size by 220 pages, ten of which belong to the excellent index. The cause of this large increase is pointed out in the preface and is due to the appending to each chapter of a series of questions on the subjects treated of in the chapter, and is intended for the student's self-examination; to the insertion, after the chapter on metrology, of typical pharmaceutical problems and exercises in alligation; to the numerous additions made in Part V, on "Magistral Pharmacy;" and to the incorporation, in Part VI, of the formulas of the National Formulary, and of others that appeared to be desirable. The former of these are distinguished from the others by the affix N. F. and by the numbers assigned to them in this publication; but they are arranged with the other formulas under the heads of their chief or characteristic constituents. A very interesting subject for study and reflection is presented by the autograph prescriptions illustrated by one hundred fac similes, the originals of which appear to have been collected from different parts of the country, and selected for some commendable, erroneous or doubtful qualities. These prescriptions and the accompanying text have been printed upon enameled paper in order to preserve the charactristics of the writing.

In its new garb the "Practice of Pharmacy" will prove as useful as heretofore, and in addition to its former will secure many new friends.

Proceedings of State Pharmaceutical Associations.

The following printed Proceedings have been received:

Iowa.—Tenth annual meeting, pp. 96.—See page 537.
New Jersey.—Nineteenth annual meeting, pp. 113.—See page 318.
New York.—Eleventh annual meeting, pp. 216.—See page 538.
Texas.—Tenth annual meeting, pp. 47.—See page 380.

Wandtafeln zur Mikroskopie der Nahrungs- und Genussmittel aus dem Pflanzenreiche. Von Docent Dr. Josef Nevinny, Assistent der Lehrkanzel für Pharmakologie und Pharmakognosie an der Wiener Universität. Gezeichnet von Dr. C. Henning. I. Lieferung. Wien: Alfred Hölder. 1889.

Charts on the microscopy of the articles of nourishment and food derived from the vegetable kingdom.

This is the first instalment of a work intended to illustrate the structural characteristics of such vegetable substances, which are used as food, or are employed for the adulteration of the same. The size of the charts being 59x86 centimeters, they afford ample room for the illustration of the important anatomical elements of each article of such a size as to be useful for class instruction. Many of the articles selected for illustration are medicinally employed, like taraxacum, ginger, cinnamon, cloves, pepper, capsicum, figs, staranise, flaxseed, almonds, nutmeg, mustard, ergot, etc.; the remainder are important articles of consumption, like tea, coffee, cacao, the cereals, beans, peas, etc., or like some of the drugs named above, or like date seeds, palm kernels, etc., are employed for the adulteration of spices or food. Examinations of articles of daily use by means of the microscope, with the view of establishing their identity and purity, are regarded as important adjuncts of chemical investigations for the objects stated; in fact microscopical researches are continually being extended in most lines of research, and microscopy, as such, is fast occupying the ground for becoming a distinct discipline of a scientific or liberal education. The work, a portion of which is now before us, is intended—in part at least—to further this evolution in one branch of research. The author, who is assistant to the chair of pharmacology and pharmacognosy at the University of Vienna, has selected the material, with good judgment, from preparations made by himself, and the drawings have been accurately and artistically made by Dr. Henning. The four charts now before us leave nothing to desire in regard to the objects in view. The parts containing four such charts, and costing eight marks each, will be issued at intervals, so that the entire work, which, for the present, is limited to sixty such plates, will be in the hands of subscribers in about two years, when it is contemplated to publish, as accompanying text, a hand-bood on the same subject. To judge from the first part now before us, the work deserves the attention of the teachers on microscopy and of pharmacognosy. and of all those who are interested in the examination of food by means of the microscope.

Foods and Food Adulterants.—Investigations made under direction of Dr. H. W. Wiley, Chief Chemist. Part V. Baking powders. By C. A. Crampton, Analytical Chemist. Pp. 560–628.

Issued as a part of Bulletin 13 of the U. S. Department of Agriculture, Division of Chemistry, the pamphlet has accomplished a very good result in showing the inferior quality of some of the commercial baking powders. A formula is given for a baking powder of a better than the average quality and which can be readily prepared at a moderate cost; the proportions are cream of tartar 8, baking soda 4, and corn starch 4 parts.

Record of Experiments at Sugar Evperimeat Stations. Bulletins 22 and 23, U. S. Department of Agriculture, Division of Chemistry.

The former of these pamphlets refers to the Des Lignes station at Baldwin, La., and the latter to Calumet Plantation at Pattersonville, La.

Composition of Sorghum Seed with reference to its feeding value.

Influence of Food, Animal Idiosyncrasy and Breed on the Composition of Butter.

Two pamphlets containing papers read before the Society for the Promotion of Agricultural Science at its tenth meeting in Toronto in August last, by H. W. Wiley, Chief Chemist of the Department of Agriculture.

Proceedings of the Sixth Annual Convention of the National Confectioners' Association of the United States. Philadelphia: Confectioners' Journal Print, 1889. 12mo, pp. 143.

The convention was held in New York, commencing July 9, 1889.

OBITUARY.

Edward B. Garrigues, the last survivor of the original members of the Philadelphia College of Pharmacy, died in this city November 3d, in the ninety-fifth year of his age. He was the father of Dr. Samuel S. Garrigues, whose death was announced in our June number. During the early history of the College he took an active interest in its affairs, rendering services on committees and as an officer of the institution. A sketch of his life is being prepared by the committee on deceased members, and will appear in a future issue.

Reinhold F. W. Rother, prominent as a writer on pharmaceutical subjects, died in Detroit, October 18, 1889, a disease of the brain being the immediate cause of his death. He was born in Landau, Silesia, in 1843, and at the age of six years came to America, his parents settling in Monroe, Mich., where Reinhold was educated, graduating from the High School. He learned the drug business at Ann Arbor, graduated in 1867 as pharmaceutical chemist from the University of Michigan, and afterward clerked in Chicago, remaining with Mr. A. E. Ebert for about eight years, during which time he wrote numerous papers for the Chicago "Pharmacist." Later on his prolific pen contributed also many papers to this and to other pharmaceutical journals. Since 1876 he was in business in Detroit, until a few years ago failing health compelled him to relinquish business. His writings, including the two works, "Beginnings in Pharmacy" and "Chemistry of Pharmacy," noticed in these pages somewhat over a year ago, are characterized by philosophical reasonings, and though often somewhat cumbersome in style, bore the stamp of scientific training, close observation, and original thought, as a rule directed to practical application. His love for, and interest in, scientific research was not confined to his writings, but was manifested also in various other ways. Thus, about five years ago he donated to the Philadelphia College of Pharmacy the sum of $500 to be applied to original chemical research, which was done with his advice and consent, and to the Chicago College of Pharmacy he conveyed some real estate which at the present time is valued at about $10,000. Mr. Rother was not married; his mother survives him.

Frederick A. Tilge, Ph. G., died in Germantown, Philadelphia, November 10, 1889, of pneumonia, aged 47 years. He was born in this city, learned the drug business with the firm of Fred. Brown, graduated in 1863, and then started in business with his brother George as importers of druggists' sundries. A few years ago he connected himself with the firm of Henry Tilge & Co., hatters, the senior member being his father, who died four days before the son.

Joseph Wiley, Ph. G., was killed by the explosion of "flash powder" at his place of business on North Seventh street, Philadelphia, November 11th, 1889. He learned the drug business with the firm of W. R. Warner & Co., of whose manufacturing department he had been in charge for some time. He graduated from the Philadelphia College of Pharmacy in 1872, afterwards was in business as a pharmacist, and for about eight years as a wholesale druggist and manufacturer, the firm name being finally Wiley & Wallace. Several accidents having occurred through the explosion of "flash powder"—a combination of powdered magnesium with oxidizing agents, Mr. Wiley was engaged in making preparations for removing from the premises the last portions of the explosive stock, when the same exploded, instantly killing him and his two assistants.

Chas. Wesley Rinedoller, Ph. G., a native of Philadelphia, was an apprentice in the store of Dr. C. G. Frowert, graduated in pharmacy in 1887, and subsequently had charge of the chemical manufacturing department of the firm of Wiley & Wallace, when he was killed by the explosion mentioned before.

Rudolph Littmann, the third victim of this explosion, was a student of the Philadelphia College of Pharmacy, and had attended the lectures and examinations up to Saturday preceding his death. At a meeting of the class his fellow-students passed the following resolutions:

Whereas it has pleased the All-wise Providence to remove from our midst, by a most distressing casualty, Rudolph Littmann, one of the members of the Junior Class of 1889 and '90 of the Philadelphia College of Pharmacy; it is therefore,

Resolved, by his Classmates, That in bowing to the will of the Almighty, we recognize the affliction that has befallen us, and tender to his family and friends our heartfelt sympathy.

Resolved, That a copy of these resolutions be engrossed and sent to the family of our deceased Classmate, and that they be published in the American Journal of Pharmacy and daily papers.

Clarence W. Elston,
Edward T. N. Stein,
C. E. Kitchen,
C. Eugene Lack,
W. O. Brice,
Committee.

INDEX

TO VOL. LXI (VOL. XIX, FOURTH SERIES), OF THE AMERICAN JOURNAL OF PHARMACY.

- Abrus precatorius, toxic action of proteids 625
- Absinthe, composition and effects of 612
- Acacia arabica, fruit, use in Egypt 189
- Academy of Sciences (Royal) at Turin 224
- Acetanilid, distinctive tests for 506
  - in phenacetin 77, 134
  - in topical preparations 458
  - use in throat diseases 515
- Acetone, detection in urine 175
  - in methyl alcohol 76
  - manufacture of 323
- Acetphenylhydrazid, compared with pyrodine 131
  - named hydracetin (see also pyrodine) 354
- Acetyl chloride, action on phenol ethers 498
- Acid, acetic, as an antiseptic 83
    - glacial, strength of 335
  - agaric, formulas, properties, etc 253
  - benzoic, distinction from vanillin 20
    - synthetical, detection of 562
  - boric, plasters containing 416
  - carbolic, color reaction (amyl nitrite) 566
    - for removal of warts (see also phenol) 85
    - synthetic, properties of 563
    - test to distinguish from resorcin 468
  - chelidonic, derivatives of 548
  - chromic, use in excessive sweating 104
  - cocaic, preparation and properties 298
  - cocrylic, preparation and composition 300
  - diamido-benzoic, action of sodium hypobromite 19
  - dithio-salicylic, formula and preparation 411
  - filicic, activity of 170
    - composition and derivatives 145
    - preparation and properties 21
  - gallic, examination of commercial 9
    - new tests (Ranson) 181
  - hippuric reaction with sodium hypobromite 19
  - humic, properties of 310
  - hydrochloric, estimation in contents of stomach 251
  - hydrocyanic, commercial, strength of 536
    - in preparations of wild cherry bark 534
  - hypogæic, product of oxidation of 471
  - hypophosphorous, commercial, examination of 459
    - methods of estimation 326, 386, 459
    - preparation of 462
  - isatropic, preparation and properties of 35
  - isoarabinic, preparation from tartaric acid 490
  - lactic, use in diarrhœa 183
    - use in tuberculous diarrhœa 314
  - lactobionic, preparation and properties of 425
  - linoleic, product of oxidation of 471
  - morrhuic, properties of 138
  - nitric, test for (resorcin) 566
  - nitrous, Griess' test for 94

Acid, nitrous, test for (apomorphine)........ 470
    test for (resorcin)........ 566
  oleic, adulterations........ 244
    commercial, detection of presence of linoleic acid........ 356
    falsification of linoleic acid........ 475
    product of oxidation of........471, 620
    specific gravity of........ 595
  persulphuric, formation of hydrogen peroxide from........ 620
  phenylpropionic, use in phthisis........ 397
  polydissolvant, preparation of........ 413
  pyrogallic, see Pyrogallol.
  quillajic, preparation, properties, etc........ 142
  salicylic, distinction from carbolic acid........ 177
    examination for homologous acids........ 353
    plasters containing........ 416
    test to distinguish from resorcin........ 468
  salicyl-sulphonic, test for albumen........ 562
  sulphanilic, test for nitrous acid........ 94
  sulpholeinic, preparation........ 413
  tannic, new tests (Rawson)........ 181
    solubility in different solvents........ 534
    use of, in burns........561, 608
  tartaric, reduction of........ 490
  ulmic, properties of........ 310
Acids, diffusion of, with bases........ 615
  of gastric and intestinal juices, recognition of........ 25
Aconite, cultivation in Cambridgeshire........ 510
  menstruum for extracting........ 536
Aconkathera Ouabaio, glucoside from........84, 469
Adeps benzoatus, preparation........ 246
Adulterations, report on........ 335
Albany College of Pharmacy........ 263
Albizzia Lebbek cultivated in Egypt........ 189
Albumen, test for (salicyl-sulphonic acid)........ 562
Albumin in urine, densimetric estimation........ 24
Alcohol, dietetic action of........ 622
  methyl, see Methyl alcohol.
Alkaloids. borates of, collyria........ 244
  reactions with fluoniobate reagent........ 19
  synthesis of........ 545
Aluminium acetate, properties........ 125
  oleate as basis of plasters........ 416
American Medical Association........ 223
      committee of conference with pharmacists........ 492
  Pharmaceutical Association, San Francisco meeting....51, 107, 160, 223, 259, 264, 434
      section on commercial interests........ 636
Amerman, Ella. Chamomile flowers........ 69
Ammonia, diffusion of, with acids........ 615
  household, strength of........ 335
  water, specific gravities of........ 516
  carbonate, titration of........ 500
Ammonium, iodide, method of decolorization........ 464
  molybdate, test for hypophosphites........ 129
Amyl alcohol, contamination with furfurol........ 133
    separation from fusel oil........ 150
  nitrite, a mixture of two compounds........ 148
    chemical constituents........ 153
Amylene hydrate, action of........ 285
Anatomical specimens, colored, preservation of........ 245
Anderson, F. W. Poisonous plants and the symptoms they produce........ 408

André, G. Mercurammonium chlorides 519
Andromedotoxin, process of isolation 360
Aniline, action of sodium hypobromite 19
Animal organism, synthetical processes of 197
Anisol, action of acetyl chloride on 498
    action of benzoyl chloride on 499
Annidalin, substitute for iodoform 609
Anthemis nobilis, constituents of flowers 69
Anthrarobin, plasters containing 416
Antifebrin, see Acetanilid.
Antifungin, composition and use of 131
Antimony, volumetric estimation in tartar emetic 28
Antipyrin, action of, on the teeth 105
    dry, incompatibility with salicylate of sodium 288
    increased solubility of quinine salts by 291
    reaction with ferric chloride 442
    use as an antigalactic 509
    use for relieving pain of cancer 314
Antiseptics, incompatible 104
Apomorphine, acetate, color reaction of 131
    hydrochlorate, remedy for coughs 23
    oxalate, color reaction of 131
    reaction with fluoniobate 19
    test for nitrous acid and nitrites 470
    use of, in coughs 104
Apple of Peru, in the Southern States 554
Aqua chloroformi, properties 68
    sinapis, preparation 127
Arachis hypogæa, cultivation in China 143
    use in Egypt 189
Archiv der Pharmacie, editorial change 588
Areca nut, alkaloids from 133, 190
Arecaine, properties of 133, 192
Arecoline, physiological action of 193
    preparation 191
    properties 133, 191
    salts of 192
Armand. Arrow-poison of the Somalis 84
    Strophantin 85
Arrack, preparation from cassava 80
Arrow-poison of the Somalis (ouabaio) 84
Arsenic, presence of, in glycerin 179, 531
    " in wall paper 438
    test for (Gutzeit) 133
        Gutzeit's improved (Ritsert) 414
Arthur, Chas. Glycerites of ferrous salts 367
Asafetida, quality of commercial 315
Asclepias Cornuti, analysis (Quackenbush) 113
    tuberosa, crystalline constituents of 114
Ash determinations, with silver or platinum 77
Aspidium Filix mas, constituents (Daccomo) 144
    oleoresin, dose of 203
Aspidol from male fern 144
Assaying, pharmaceutical (Drescher) 337
Atropine, constitution of 547

Ball, A. Suggestions for the use of lanolin in pharmacy 418
Ballo, M. Reduction of tartaric acid 490
Balsam of sulphur, preparation of fragrant 22
        tolu, process for emulsionizing 559
Balsamodendron Berryi, gum resin from 508

Atropin 547

Balsams, chemical examination (*Dieterich*) 357
Barium bromate, preparation of 119
Bases, diffusion of, with acids 615
Bay rum, formula for 312
Bear, J H. Syrupus rhei aromaticus 128
Beauvais, Jos. Anatomical structure of Grindelia robusta 82
Beckwith, J. W. Fluid extract of apocynum 127
Beef, scraped, preparation of palatable 473
Beef-fat, detection of in lard 195
iodine number 197
Beer, presence of picrotoxin in 443
Belladonna, cultivation in Cambridgeshire 511
menstruum for extracting 536
southern representative of 553
root, alkaloidal strength, variation of 440
powpered, assay of 335
Benzamide, action of sodium hypobromite 19
Benzonitril, action of sodium hypobromite 19
Benzoyl chloride, action on phenol ethers 499
Beringer, G. M. Adulteration of ground flaxseed 167
Adulterated Spanish saffron 607, 635
Expressed oil of almonds 230
Note on loco weeds 408
Notes from various journals 468
Oleates 593, 634
The Hungarian daisy as an adulterant of insect powder 1
Tincture of strophanthus 454
Titration of ammonium carbonate 500
Berthelot, Mr. Action of acids on thiosulphates 524
Betaines, analogous compounds 548
Bismuth, reaction with cinchonine and potassium iodide 82
oleate, preparation of 599
oxiodide, comparison of processes 161, 236
Bitter root (Lewisia), use and constituents of 4
Blackberry bark, analysis of (Krauss) 605
brandy, formulas and examination of commercial 467
Blue, Prussian, preparation of soluble 429
Bone fat, iodine number 197
Boole, Miss L. E. and *Prof. Dunstan.* Chemical observations on tartar emetic 27
Bor ice, preparation and use 178
Boroglycerides, preparation and properties 130
Boron, preparation of, from borax 602
trichloride, preparation of (Maisch) 603
Burget, Dr. Chemical changes in the gastric juice 572
Bourquelot, E. Keratin and keratinized pills 421
Bowers, C. E. Oil of maize 503
Bowman, D. B. Unguentum hydrargyri 466
British Pharmaceutical Conference 526
Brou, injection, formula 80
Brown, A. P. New medium for mounting starches and pollens 171
Oleate of mercury 168
Brucine acetate, color reaction of 131
derivatives from 549
quantitative separation from strychnine 180
reaction with chlorine 19
Buckingham, J. H. Modified formula for Brown mixture 75
Buffalo College of Pharmacy 263
Burns, application for, cocaine 137
tannin 561, 608
Butterfield, F. V. Photography 45, 99, 155, 199
Butyl chloride, administration of 473

Cacao, ratafia of, directions for making........ 80
Caffeine, granular salts, commercial, examination of........ 9
  phenate, preparation, action and dose........ 288
  and benzoate of sodium, incompatibility with acid fruit syrups........ 288
Calcium boroglyceride, preparation........ 130
  hypophosphite, determination of purity (Moerk)........ 391
  strophanthate, effects and properties of........ 287
Calendula officinalis, cultivated in gardens........ 554
Calophyllum Inophyllum, oil of seed........ 87
Calumba, southern representative of........ 553
Calvert, John. Chinese extract of opium........ 440
Camphor liquefied by phenols........ 136
Canaigre, as a tanning material........ 395
Cannon, C. W. Bases for unguentum iodi........ 128
Cantharides, determination of cantharidin........ 21
Cantharidin, uses of, in pharmacy........ 439
Caoutchouc, see Rubber.
Capparis Sodada, use of root in Egypt........ 188
Capsaicin, source and isolation........ 179
Carbohydrates, presence in urine........ 20
Carbon disulphide, purification of........ 468
Carroll, S. L. Salicylate of cinchonidine........ 124
Carter, Dr. Principle of disinfection in medicine........ 483
Cascara sagrada, see Rhamnus Purshiana.
Casearia esculenta, medical properties and constituents of........ 536
Cassaday, F. V. Euonymus atropurpureus........ 284
Catarrh cure, analysis of........ 10
Catechu, medicinal, examination and estimation........ 165
Celluloids, phenolated, for surgical use........ 559
Cellulose, colloidal, preparation and properties of........ 568
Cera amylata, as pill excipient........ 294
Ceratum petrolati, formula (Nicot)........ 175
  resinæ comp., in the pharmacopœia........ 316
Chamælirium luteum, medical properties and constituents........ 553
Chamomile flowers, constituents of........ 69
Cherry-gum, substitute for gum arabic in emulsions........ 178
Chimaphila umbellata free from andromedotoxin........ 361
Chloral hydrate, action upon glass........ 506
  use in night sweats........ 352
Chloralamid or chloral formamid, hypnotic action of........ 523
Chlorates, phenol and orcinol as tests for........ 92
Chlorine in sulphuric acid, reactions of certain alkaloids........ 19
  vapor-density of........ 95
Chloroform, benzoated, preparation and uses of........ 105
  manufacture of, from acetone........223, 321
Chlorophyll, coloring principles of (Hansen)........ 561
Chocolate, purgative, preparation of........ 472
Chrysanthemum cinerariæfolium, description of flower........3, 295
Chrysarobin, plasters containing........ 416
Cinchona alkaloids, bromates of........ 119
Cinchonidine bromate, preparation and properties of........ 120
  salicylate, preparation........ 124
Cinchonine bromate, preparation and properties of........ 121
  derivative from........ 549
Cincinnati College of Pharmacy........ 221
Cineol, present in volatile oils........ 371
Cinnamomum Kiamis, bark, description of........ 38
  xanthoneuron, bark, description of........ 37
Classen, Edo. On filters........74, 159
Clethra alnifolia and arborea free from andromedotoxin........ 361
Cloves, artificial, composition and detection........ 411

Cobalt, elementary nature of (Fleitmann) 430
  new metal in, and redetermination of atomic weight 132
Coca, cultivation in the East Indies 580
  bases, chemistry of (Hesse) 296
  leaves, assay of (V. d. Marck) 294
    East Indian, assays of 358
    varieties in the market 297
Cocaine, alkaloids occurring with 296, 433
  color reaction with resorcin 470
  impure, reaction with resorcin on 507
  reaction of, with borax 18, 254
  synthesis of 549
  tests for (Greittherr) 563
  toxic effects 81
  use of, with lanolin, for burns 137
Cocamine, physiological action of 299
  preparation and properties 297
Cocamylecgonine from coca leaves 298
Cocoanut as a taenicide 487
Cocrylecgonine and cocrylamine from coca leaves 300
Codeine, synthetical preparation of 135
Coffee, effect on the urine 141
Colchicine, use in certain eye affections 283
Collodium, preparation of clear 415
Collutorium sinapi, formula 126
Collyria of alkaloid borates 244
Congress, International medical in 1890 540
    of hydrology and climatology in 1889 383
    of therapeutics and materia medica in 1889 383
    pharmaceutical in 1890 493
Conine, synthesis of 546
Conroy, M. Linimentum opii ammoniatum 98
Contrayerva root, white, origin of 351
Copaiba, adulterations present in 336
Copper oleate, preparation of 597
  salts, reaction with potassium bromide 289
Coronilla scorpioides, properties of bitter principle 81
Coumarin, list of plants containing 375
Crafts, J.M. and *C. Friedel.* Vapor density of chlorine and ferric chloride 95
Creasote, administration of, with cod liver oil 428, 559
  distinguished from guaiacol 470
  plasters containing 416
  tests for purity of 176
  use in phthisis 314
  use of, for hiccough 587
Creolin, constituents of 176
  Jeyes', contains resin soap 294
Cresols, salicylates, preparation and properties of 243
Cubebs, immature, description of 117
Culin, W. Tinctura ferri chloridi 123
Cupreine, preparation and salts of 573

D*accomo, G.* Aspidium Filix mas 144
Daisy, Hungarian, an adulterant of insect powder 1, 50
    structural characteristics of 295
Dallas Pharmaceutical Association 222
Dammar, composition of 176
Davies, R. H. Iodine absorption equivalents of essential oils 301
Death camass of Indians, Zygadenus venenosus 410
Deitz, Geo. A. Fabiana imbricata 405
Dentifrice, see Toothpowder and Toothwash.

Dextrin, substitute for gum arabic........ 469
DeZaayer, H. G. and *P. C. Plugge.* Andromedotoxin........ 360
Diamine metaphenylene hydrochlorate, action of sodium hypobromite.... 19
Diamine-toluilene, action of sodium hypobromite........ 19
Diastase, artificial, preparation from wheat gluten........ 432
  estimation in malt extract........ 482
Digitalis ambigua, consituents of........ 20
  purpurea, cultivation in Cambridgeshire........ 512
    influence of heat on toxic power........ 174
Diosmin, preparation and chemistry of........ 86
Diospyros virginiana, bark, constituents........ 69
Diphenyl methylpyrazol, preparation and properties........ 20
Disinfection in medicine, principle of........ 483
Drescher, A. On pharmaceutical assaying........ 337
Dressings, beta-naphthol, formulas,........ 289
  phenoloted pyroxylin........ 559
Drug exhaustion, effect of moisture on........ 438
  sections, preparation for microscopical examination........ 42
Drugstores, early closing of........ 636
Dunstan, Prof. and *E. J. Woolley.* Chemical constituents of amyl nitrite... 153
    L. E. Boole. Chemical observations on tartar emetic........ 27
    W. L. Williams. Metameric amyl nitrites........ 148
Dunwody, R. G. Commercial tar........ 600, 634

Eads, R. I. Iodides of mercury........ 123
Einhorn, A. Alkaloids occurring with cocaine........ 433
Eldredge, C. S. Lime water........ 336
Electrode indicator, preparation of........ 131
Elm, slippery, adulteration of ground bark........ 261
Emulsion of petrolatum, preparation of........ 559
  of tolu balsam, preparation of........ 559
Emulsions, preparation with mucilage of acacia and sugar........ 291
Enemeta of hypnone, chloral and sulphonal (Vigier)........ 416
England, Jos. W. Infusion of digitalis........ 341
    Permanent syrup of hydriodic acid........ 14
    Tincture of mustard........ 124
Eriodictyon californicum, analysis of leaves........ 70
Ergosterin, preparation and properties of........ 173
Erythroxylon Coca, see Coca.
Eschscholtzia californica, constituents of........ 18
Eucalyptol present in volatile oils........ 371
Eucalyptus, species yielding kino........ 627
Euonymus atropurpureus, analysis of root bark (Cassaday)........ 284
    constituents of root bark (Naylor and Chaplin)........ 530
Exalgin, characteristic differences from strychnine........ 417
  effect compared to antipyrine........ 243
Exposition, Universal, at Paris........ 52
Extract aconite, assay of (van Itallie)........ 134
  beef, containing the albuminoids........ 635
  belladonna, assay of (van Itallie)........ 134
  conium, assay of (van Itallie)........ 134
  glycyrrhiza, test of purity........ 248
  hyoscyamus, assay of (van Itallie)........ 134
  opium, Chinese method of preparing........ 440
  malt, estimation of diastase........ 482
  psoralea melilotoides, preparation........ 351
  rhamnus purshiana, recovery of alcohol........ 184
    tasteless, not active........ 185
  stramonium seed, preparation of........ 527
  valerian, loss of volatile oil in preparing........ 417
  fluid, apocynum, experiments with different menstruums........ 127

Extract fluid, psoralea melilotoides, preparation........ 351
    rhamnus purshiana, modified process........ 184
    viburnum, remedy for vomiting of pregnancy........ 128
Extracts, narcotic, assay of........ 134
  use of cold in preparation........ 242
  fluid, manufacture by retail pharmacists........ 51

Fabiana imbricata, crystalline principle in........ 407
    habitat, analysis, etc........ 405
Falk, J. C. Iodide of ammonium........ 464
Fat, synthesis in animal economy........ 198
Fats, animal and vegetable, distinction of........ 507
Ferri et ammonii citras, manipulation in preparing........ 527
Ferric albuminate, with sodium citrate, preparation........ 292
  chloride, vapor density of........ 95
  hypophosphite, determination of purity (Moerk)........ 392
  oxychloride solution with sodium citrate, preparation........ 293
  peptonate, with sodium citrate preparation........ 293
Ferricyanides, action of sodium hypobromite upon........ 19
Ferrocyanides, action of sodium hypobramite upon........ 19
Ferrous iodide incompatible with potassium chlorate........ 79
  phospho citrate, crystalline, preparation of........ 560
  salts, glycerites of, preparation........ 367
  solutions, preservation by hypophosphorous acid........ 440
Ferrum dialysatum, concentration of by freezing........ 414
  reductum, commercial, quality of........ 335
Filemonowics, J. and *B. Pawlewski.* Solubility and estimation of paraffin.... 152
Filters, folding of (Claassen)........74, 159
Fischer, E., and J. Meyer. Oxidation of milk-sugar........ 425
Flannels, mercurial, preparation of........ 611
Flaxseed, amount of oil in........ 442
  ground, adulteration of........167, 204
Fleitmann, Dr. On the nature of cobalt and nickel........ 430
Fluorescence, preparations for destruction of........ 132
Foerster, F. and *F. Mylius.* Solubility of glass in water........ 518
Fokker, Dr. Acid fermentation of milk........ 479
Frangula, southern representative of........ 553
Franklin Institute, award of medals by........ 51
Frasera Walteri, American columbo........ 554
Freezing mixture, containing carbon dioxide........ 177
Friedel, C. and *J. M Crafts.* Vapor density of chlorine and ferric chloride 95
Fritillaria pudico a loco weed........ 409
Fromentine (wheat embryo), an alimentary substance........ 361
Fuge, H. D. Note on cascara sagrada........ 184
Furfurol present in amyl alcohol........ 133

Gastric juice, acids present in........ 25
    chemical changes in........ 572
Gaultheria procumbens free from andromedotoxin........ 361
Gelatoles from castor oil soap........ 443
Gentian, southern representatives of........ 553
Geranium maculatum, constituents of (Mayers)........ 238
Gillispie, H. R. Nepeta Cataria........ 555
Ginger resin, properties of........ 558
Glass, action of chloral hydrate on........ 506
  a new optical (phosphates and borates)........ 412
  solubility in dilute acid........ 527
  solubility in water........ 518
Glenk, Rob. Methysticin from Piper methysticum........ 8
    Resin from flowerbuds of Populus tremuloides........ 240
    Resin of ginger........ 558

Glenk, Rob. Sick headache powder.. 142
Glucose, commercial, use in pharmacy.. 439
  presence in milk sugar.. 249
  volumetric estimation (Causse).. 78
Glue, substitute for gum arabic in emulsions.. 178
Glycerin, action upon vulcanized rubber.. 287
  arsenic present in..179, 531
  iodized, prevention of evaporation of iodine.. 366
  tests of purity of.. 23
Glyceritum acidi gallici, crystallization of freshly prepared samples.. 182
  ferri bromidi, formula.. 368
    iodidi, formula.. 368
Glycocol, reaction with sodium hypobromite.. 19
Glycolin, properties of.. 316
Gold bromide, effect and dose of.. 290
  chloride as tests for fixed oils..23, 65
Gorgeu, A. Manganese oxides and manganous carbonate.. 522
Graduates, cleaning of.. 236
Granules, atropine, preparation of.. 587
  of morphine sulphate, assay of.. 336
Granval and *Valser.* Falsification of oleic acid.. 475
Greenawalt, Wm. G. Oleoresin of male fern.. 169
Greene, Chas. E. Bismuthyl iodide.. 161
Griess' test for nitrous acid.. 94
Grindelia robusta, anatomical structure.. 82
Grosse, G. M. Reduced iron.. 335
Groundnuts, cultivation in China.. 143
  use in Egypt.. 189
Guaiacol, properties, reactions of.. 249
  test for distinguishing from creasote.. 470
Guignet, C. E Colloidal cellulose.. 568
    Soluble Prussian blue.. 429
Gum-resins, chemical examination of (Dieterich).. 357
Gum soluble in tragacanth.. 72
Gypsophila Struthium yields a soap root.. 188

Hanbury medal, award of.. 492
Handler, W. Simple syrup.. 335
Havard, Dr. V. Lewisia rediviva.. 4
    Peucedanum, species used by the Indians.. 556
    Psoralea esculenta.. 346
Heckel, E. and *Fr. Schlagdenhauffen.* The root of Vernonia nigritiana.. 40
Helleborein as a local anæsthetic.. 104
Helonias dioica, pharmacopœial recognition of.. 553
Henna, use of, in Egypt.. 189
Henney, S. F. Lycopus virginicus.. 70
Hesse, O. Chemistry of coca bases.. 296
Hibiscus Sabdariffa, use of calyx.. 204
Hiccough, to remove.. 11
Hill, J. R. American tinctura quillajæ.. 138
Hofmeister, H. On agaric acid.. 253
Hog potato of California, Zygadenus.. 410
Holmes, E. M. Cultivation of medicinal plants in Cambridgeshire.. 510
    Massoi bark.. 37
Honey, eucalyptus, a fraudulent product.. 264
Hooper, David. Balsa nodendron Berryi.. 508
    Laurel-nut oil.. 87
Hoppe-Seyler, F. Humous substances.. 309
Hostetter, A. G. Potassium tartrate.. 335
Humous substances, formation of.. 309
Hydracetin, characteristics, dose, etc.. 354

Hydrangin, composition of.....117, 158
Hydrogen peroxide, formation of, from persulphuric acid..... 620
Hyoscine, action of..... 81
Hyosyamus, cultivation in Cambridgeshire..... 511
Hyponitrous oxide, preparation of pure..... 132
Hypophosphites, ammonium molybdate as a test for..... 129
  methods of estimation.....326, 386
Hysterionica Baylahuen, medicinal properties..... 173

Infusum, digitalis, formula for (England)..... 341
    toxic power reduced by concentration.....174
  gentianæ concentratum, formula for (Johnston)..... 535
Injection Brou, formula for..... 80
Ink, marking, substitute for (magnolia leaves)..... 8
  stains, removal of..... 76
Insect flowers, structural characteristics of..... 295
  powder, adulteration with Hungarian daisy.....1, 50
    adulterated with quillaia..... 177
    detection of turmeric in..... 22
Insecticide, preparation of (Kühl)..... 355
Intestinal juice, acids contained in..... 25
Iodine, new topical preparation (Symonnet)..... 415
  phenol, formula and use in whooping cough..... 411
Iodoform, action of solvents on.....131, 288
  behavior with ether..... 20
  decomposition of, in solution.....131, 288
  poisoning in children..... 289
  preparation from acetone..... 175
  substitute for (annidalin)..... 609
Ipecacuanha, standardized preparations of..... 529
  volatile alkoloid in..... 78
Iron, see Ferric, Ferrous and Ferrum.
Isobutyl nitrite, preparation of..... 150
    presence in amyl nitrite..... 154
Isatropylcocaine, preparation and propertics..... 34

***J**acobs, O. B.* Tinctura gentianæ composita..... 467
Jalap, assay of (Drescher)..... 340
Jamaica, calyx of Hibiscus Sabdariffa..... 204
Jellies, commercial, analysis (Jones)..... 12
Jones, L. M. Analysis of market jellies..... 12
Johnson, C. G. Bromates of the cinchona alkaloids..... 119
Juglans regia, characters of oil..... 419

Kansas University, School of Pharmacy..... 376
Kalmia latifolia contains andromedotoxin..... 361
Kavaïne, alkaloid of kava-kava..... 136
Kelly, J. P. Blackberry brandy..... 467
Keratin, source, use, etc..... 421
Kino, eucalyptus, history, properties and uses..... 626
  examination of commercial..... 70
Kisch, W. and *J. König.* Examination of commercial peptones..... 525
Kobert, R. Quillajic acid..... 142
König, J. and *W. Kisch.* Examination of commercial peptones..... 525
Krauss, G. A. Analysis of blackberry bark..... 605
Kraus, G. Physiology of tannin..... 567
Kuder, Wm. Granular salts of caffeine..... 9

Lard, detection of cottonseed oil and beef fat..... 195
  iodine number..... 197
Lanolin, historical notes on..... 439
  in suppositories..... 80

Lanolin, suggestions for the use of.... 418
Lawsonia leaves, use in Egypt.... 189
Lead oleate, preparation of.... 596
Ledum palustre free from andromedotoxin.... 361
Lemon juice, acid strength of.... 534
Lenhardt, O. F. Eriodictyon californicum.... 70
Lenz, W. Recent processes for testing quinine.... 146
Leucocrinum montanum a loco weed.... 409
Lewisia rediviva, uses and constituents of root....4, 49
Liebermann, C. Isatropylcocaine.... 34
Lime, chlorinated, commercial, examination of (Schroeter)....13, 49
Lindo, D. Phenol and allied substances as tests for nitrates, etc., in aqueous solution.... 90
Linimentum opii ammoniatum, properties of crystals deposited.... 98
Liquidambar orientale, bark, use in Egypt.... 188
Liquor calcis, strength of.... 336
cinchonæ preparation (Rolffs).... 247
Donovan, deterioration of.... 439
ferri chloridi, preparation from different kinds of iron.... 122
dialysatus, concentration by freezing.... 414
magnesii citratis, modification of formula (Patch).... 438
morphinæ meconatis, proper strength of.... 536
potassii arsenitis, deterioration of.... 413
Lithium carbonote, test of purity.... 356
salts, effect upon uric acid and urates.... 530
sulphate, solubility in alcohol.... 356
Loco weed, poisonous properties of.... 49
weeds, varieties and effects of.... 408
Louisville College of Pharmacy....222, 376
Medical Herald, editorial change.... 637
Lowe, C. B. Immature cubebs.... 117
Refined tar of commerce.... 234
Lowenberg, J. Morphine sulphate.... 336
Lunge, G. and *T. Wiernik.* Specific gravities of ammonia solutions.... 516
Lycopus virginicus, constituents of.... 70
Lynch, A. J. Assays of milk.... 16

Macon, G. H. Pill excipient for potassium parmanganate.... 467
Magnesia, heavy calcined, fraudulent.... 121
Magnesium boroglyceride, preparation.... 130
silicate, use in chronic diarrhœa.... 84
Magnolia glauca, analysis of leaves.... 6
use for marking.... 8
Maiden, J. H. Botany Bay or eucalyptus kino.... 626
The resin of myoporum platycarpum.... 623
Maisch, H. C. C. Action of acid chlorides on phenol ethers.... 497
Contribution to the knowledge of boron.... 602
Maisch, J. M. Note on andromedotoxin in ericaceæ.... 361
Note on filicic acid.... 171
Note on use of magnolia leaves.... 8
Notes on some indigenous remedies.... 552
On soluble gum tragacanth.... 72
Origin of false senega root.... 439
Preparations of mustard for internal use.... 126
Useful plants of the genus psoralea.... 345
Mandragorine, alkaloid from mandragora autumnalis.... 355
Manganese carbonate, action of air on....523, 619
oxalate, advantage over other compounds for drying oils.... 77
peroxide, reaction with potassium chlorate.... 250
Manganous oxide and salts, behaviour to air, heat and chemicals.... 522
Manihot utilissima, preparation of arrack from.... 80

Martin, Sidney. The toxic action of abrus precatorius.......... 625
Martindale, Wm. Egyptian opium and other drugs.......... 187
Maryland College of Pharmacy.......... 221
Massachusetts College of Pharmacy.......... 317
Massoi bark, source of.......... 37
Mayers, H. J. Geranium maculatum.......... 238
McCloskey, C. E. Belladonna root.......... 335
McLeod, H. Decomposition of potassic chlorate in presence of manganic peroxide.......... 250
Meconarceine, hypnotic action of.......... 104
    mixtures sold as.......... 176
Medal, Hanbury, award of.......... 492
Meissner, F. N. Gallic acid.......... 9
Melvin, G. Note on glycerinum acidi gallici.......... 182
Mercurammonium chlorides, preparation, composition and properties.......... 519
Mercuric benzoate, preparation.......... 353
    chloride, solubility in sodium chloride.......... 78
    iodide, antiseptic properties of.......... 316
    oleate, preparation..........168, 204, 598, 634
    phenolate, preparation of a definite compound.......... 135
    salicylate, process by precipitation.......... 249
Mercurous chloride, effect of sodium chloride.......... 123
Mercury, inhalation from flannels.......... 611
    iodides, preparation (Eads).......... 123
Methacetin, distinctive tests for.......... 506
    preparation and propertiss.......... 291
Methyl alcohol, presence of acetone in.......... 76
Methylaniline, action of sodium hypobromite upon.......... 19
Methyl chloride, apparatus for preparing.......... 530
Methysticin, preparation and properties.......... 8
Meyer, C. C. Amber guaiac.......... 286
Meyer, J. and *E. Fischer.* Oxidation of milk sugar.......... 425
Microscope, preparation of drug sections for.......... 42
Milk, acid fermentation of.......... 479
    assays (Lynch).......... 10
    cow's, dilution for infant feeding.......... 424
    estimation of proteids in.......... 363
    nature of (not an emulsion).......... 81
    salts of, relation to behavior of casein.......... 476
Milksugar, diuretic properties of.......... 417
    detection of glucose in.......... 249
    oxidation of.......... 425
Millard, E. J. Molybdate test for hypophosphites.......... 129
Mistura glycyrrhizæ comp., modified formula (Buckingham)..........75, 106
Mixture of exalgin, formula for.......... 417
        picric acid, use in erysipelas, etc.......... 473
Mohilansky, A. M. Dietetics of alcohol.......... 622
Moerk, F. X. Bismuth oxyiodide.......... 236
    Gleanings from German Journals..........20, 76, 130, 176, 245, 290, 353. 411, 470, 505, 561, 608
    Gold chloride and silver nitrate as tests for fixed oils.......... 65
    Hypophosphorous acid and hypophosphites..........326, 386, 459
    Olive oil.......... 225
Molybdate test for hypophosphites.......... 129
Montreal College of Pharmacy.......... 636
Morison, J. L. D. Sodium chloride and mercurous chloride.......... 123
Morphine, alteration in aqueous solution.......... 244
    antidote to (picrotoxin).......... 176
    in Eschscholtzia (Bardet).......... 18
    reaction with fluoniobate.......... 19
    acetate, commercial, quality of.......... 336

Morphine hypophosphite, preparation of 530
oleate, extemporaneous preparation 442
sulphate, commercial, water of crystallization 336
Morrhuol, preparation of 442
Mortars, cleaning of 236, 261
Murphy, F. E. Diospyros virginiana 69
Musk, commerce of 376
Mustard, preparations for internal use 124, 126
Mutton fat, iodine number 197
Myers, Carvosso O. Scutellaria lateriflora 554
Mylius, F., and F. Foerster. Solubility of glass in water 518
Myoporum platycarpum, resin of, properties and composition 623
Myrrh, variety from Balsamodendron Berryi 508
Myrtol, commercial, is a mixture 247
internal use of 105

Naphthol (beta), formulas for dressings 289
for internal use 289
solutions, preparation of 416
Naphthyl ethers, action of acetyl and benzoyl chloride on 499
Narceine, commercial, impurities present in 294, 533
reaction with chlorine 19
meconate, composition and properties 176
Narcotine, derivatives from 549
reaction with chlorine 19
National College of Pharmacy 317
Nepeta Cataria, analysis of (Gillispie) 555
Nereine, physiological action of 174
New York College of Pharmacy 263, 317
Nicandra physaloides naturalized in the South 554
Nickel, elementary nature of (Fleitmann) 430
new metal in, and redetermination of atomic weight 132
Nicotine, constitution of 547
tartrate, acid, preparation and properties 292
Nitrates, orcinol as test for 92
phenol as test for 91
test for (resorcin) 507
Nitrites, orcinol and phenol tests for 91
test for (apomorphine) 470
Nitrobenzol, fluorescence destroyed by 132
detection in oil of bitter almonds 77
Nitrogen monoxide. preparation of pure 132
Nitronaphthalin, fluorescence destroyed by 132
Nitroprussiates, action of sodium hypboromite upon 19

Obituary—Alexander, E. V 160
Buck, George 591
Chevreul, M. E 272
Davis, B. B. 160
De la Rue, W 319
Duflos, A. F 592
Engler, J. G 160
Galbreath, T. M 160
Garrigues, Edward B 639
Garrigues, S. S 319
Geuther, Anton 543
Gross, S. W 272
Hesson, R. L 160
Hughes, C C 160
Jacobson, Oscar 544
Martin, W. J 224
Littmann, R 640
Menninger, H. J 544
Rebner, C. M 544
Rinedoller, C. W 640
Rother, R 639
Schlickum, O 319
Tilge, F. A 640
Vogel, Aug 544
Weightman, W., Jr 224
Wiley, Jos 640
Wilgus, J. F 319
Williams, J 224
Wingert, J. V 160
Oerter, A. E. Liquor ferri chloridi 122
Ogle, J. Composition of tragaganth 427

- Oil, almond, expressed, improvement of color by blanching 370
    - yield of sativic acid 471
    - properties and reactions (Beringer) 230, 261
  - angelica, comparison of Japanese and German 311
  - anise, annual production 311
    - congealing point 255
  - arachis, fluid fatty acids of 471
  - artemisia glacialis, yield and properties 374
  - bear root, source and properties of 374
  - bergamot, adulterants of 515
    - color of 312
  - betel, composition 312
  - birch, comparison with wintergreen oil 398
  - cajeput, adulteration with camphor oil 313
  - calamus, difference between Japanese and European 313
  - camphor, analysis 273, 315
    - character and composition 313
    - composition of an old sample 333
  - cananga, uses of 314
  - cantharides, from cantharidin 291
  - carlina root, properties of 374
  - castor, detection of rosin oil in 611
    - iodine number 197
  - chamomile, prevention of change of color 314
  - cinnamon, pure and adulterated, properties of 370, 575, 609
  - citronelle, export from Ceylon 370
  - cocoanut, iodine number 197
  - codliver, administration of (with lime water, etc) 517
    - alcoholic extract of, morrhuol 442
    - combination with creasote 428
    - constituents of 560
    - determination of iodine in 248
    - morrhuic acid present in 137
  - cottonseed, iodine number 197
    - in olive oil, test for 23
    - presence in lard 195
  - elemi, constituents, etc 412
  - eucalyptus, odor, source, production, etc 371
  - geranium, adulteration of 371
  - hinoki, source, characteristics, etc 374
  - hop, distillation 372
  - iris, distillation 372
  - kesso-root, source of 372
  - kuro-moji, source, characteristics, etc 374
  - laurel-berries, constituents of 412
    - leaves, constituents of 412
    - nut (calophyllum) use and properties 87
  - lemon, adulteration of 515
  - lindera sericea, properties 375
  - linseed, iodine number 197
  - lycopodium, composition of 414
  - mace, specific gravity, characteristics, etc 412
  - maize, uses in pharmacy 442
    - yield and properties of 503
  - mercurial (gray), benzoated, preparation of 16
  - meum athamanticum, yield and properties 374
  - mineral, presence in fixed oils, test 413
  - mountain wormwood, properties and yield of 374
  - muscatel sage, source and yield 374
  - myrcia, constituents of 413
    - formulas for "bay rum" 312

Oil, myrtle, composition of.. 246
neatsfoot, iodine number 197
olibanum, constituents and characteristics.... 412
olive, comparison of American with foreign............................ .. 225, 261
detection of cotton-seed oil in (auric chloride)...............................23, 65
iodine number..197, 226
onion, distillation of 374
palm, iodine number.. 197
peppermint, relation of production to demand.................................. 372
petitgrains, commercial value of 372
rapeseed, iodine number 197
retinospora resembles savin........... 374
rose, determination of purity.................... 373
sage, constituents, etc 412
salvia sclarea, properties and yield... 374
sassafras, poisoning with.. 116
sesame, yield of sativic acid 471
star-anise, congealing point of, ... 256
yield, varieties, etc............................ 474
sunflower, composition of 471
walnut, preparation, use, etc... 419
wintergreen, artificial, composition of.. 403
comparison with birch oil...................... 398
Oils of aurantiaaeæ, manufacture from the peels.. 512
fixed, detection of mineral oil in 413
gold chloride and silver nitrate as tests for.......... ....65, 106, 226
non-drying, composition of 471
rancid, treated with alcohol 247
vegetable, contain linolein 507
volatile, color reactions.. 180
iodine absorption.. 301
Ointment, see Unguentum and Paste, medicated.
for burns. 137
Ointments, preparation with tragacanth 287
Oleandrine, physiological action of.................... 174
Oleate of morphine, extemporaneous preparation...................... 442
Oleite, a castor-oil soap.. 443
Oleoresina aspidii, activity of precipitate in......... 169
Opium, Egyptian, of the Cairo bazaars.. 187
Orcinol as test for chlorates, nitrates and nitrites................ 91
Orthomethylacetanilide, see Exalgin.
Ouabain, preparation and properties.. ...84, 469
Oudemans, A. C., Jr. Cupreine.. 573
Owings, O. Y. Sodium carbonate and bicarbonate.................................. 336
Oxydendrum arboreum, free from andromedotoxin...................................... 361
Oxygen, preparation from permanganate......................... 79
of pure, from hydrogen peroxide 565
Oxytropis Lamberti, a loco weed.. 409

Papain compared with pepsin.. 527
Papayotin, use in fissure of the tongue... 16
Paper, litmus, blue, preparation of sensitivee........................ 245
test, for electrode............................. 131
Paraffin, estimation in petroleum and lubricating oils 22
liquid. a colorless variety, glycolin 316
solubility and estimation 152
Paste, medicated, for skin diseases (Unna)... 17
Pawlewski, B., and *J. Filemonowics.* Solubility and estimation of paraffin... 152
Pelargonium zonale, coloring matter of flowers 443
Pepper, black, a novel adulterant (iron ore)... 470
Pepsin in normal and pathological urine.... 365

Pepsin, tests, relative value of....440, 527
Peptones, commercial, examination of.... 525
Perier, L. Solubility of sugar in water.... 567
Petrolatum, process for emulsionizing 559
Petroleum, fluorescence destroyed.... 132
Peucedanum eurycarpum, constituents of.... 557
  species used by the Indians.... 556
Pflüger, E. Synthetical processes in the animal organism.... 197
Pharmaceutical Congress, seventh international.... 493
Pharmacists and medical profession, joint committee.... 492
  educational qualifications.... 444
  theoretical and practical training.... 445
Pharmacopœia convention, delegates to.... 540
    for revision, call for....258, 263
  nomenclature, suggestions for (Oldberg) 439
  revision, recommendations for 437, 440
Pharmacopœias, publication of new.... 587
Pharmacy Board, Pennsylvania....492, 588
  law, Pennsylvania, supplement to.... 381
Phenacetin, detection of acetanilid.... 134
    of antifebrin in.... 77
  distinctive tests for.... 506
  reaction with chlorine.... 18
    with nitric acid.... 442
  value in whooping cough.... 369
Phenetol, action of acetyl and benzoyl chlorides on.... 499
Phenol, as tests for nitrates, nitrites and chlorates.... 90
  see also Acid carbolic.
Phenols, camphorated, preparation.... 136
  color reactions of.... 565
Phenol ethers, action of acid chlorides on.... 497
  varnish for surgical dressings.... 559
Philadelphia College of Pharmacy:
    Alumni Association....159, 217
    Class of 1888–1889.... 55
    Commencement.... 216
    Examinations.... 205
    Exhibition of progress.... 218
    Extension of course.... 262
    Graduates.... 212
    Honorary members.... 262
    Minutes of meeting.... 201
    Pharmaceutical meetings....19, 105, 158, 204, 260, 315, 586, 634
Phlobaphen, properties of.... 310
Photography, history and process (Butterfield)....45, 99, 155, 199
Photomicrography, simple apparatus for 439
Picrotoxin, antidote for morphine....176, 240
  presence of, in beer.... 443
Pill excipient, preparation of (Witherow).... 466
Pills, creasote (Bouchard).... 559
  ichthyol, balsam of tolu coating.... 76
  keratinized, insoluble in gastric juice. 421
  potassium permanganate, excipient for (Macon).... 467
  purgative, Prof. Ball's formula.... 175
  salol, preparation with wax... 411
  tar and iodoform, formula (Negel).... 473
  thymol, preparation with soap.... 71
Pilulæ odontalgicæ, formula (cocaine).... 22
Pines of California 271, 443
Pinus palustris for obtaining turpentine.... 316
  silvestris, composition of resin from 132, 362

Piper methysticum, methysticin from........ 8
preparation of kavaine from........ 136
Plants, poisonous, syptoms produced by........ 408
some Indian food (Trimble)........4, 556
Plasters, aluminium oleate and cautchouc as bases for........ 416
see also Paste, medicated.
Plugge, P. C. and *H. G. de Zaayer.* Andromedotoxin........ 360
Podophyllotoxin, preparation of, from podophyllin........ 177
Poisonous plants of California........ 443
Pollens, new medium for mounting........ 171
Polygala alba, origin of false senega........ 451
Boykinii, distributiou of........ 450
Pomade for chapped hands........ 521
Populus tremuloides, resin from flower buds........ 240
Potassio-cinchonine iodide, reagent for heavy metals........ 82
Potassium bitartrate, adulteration of........ 337
bromate, preparation of........ 119
chlorate, a dangerous prescription 174
decomposition of, in presence of manganic peroxide........ 250
incompatible with iodide of iron 79
identification of, in legal cases........ 354
fluoniobate in sulphuric acid, reaction of alkaloids........ 19
hypophosphite, determination of purity (Moerk)........ 391
iodide, and syrup of tolu, cause of yellow tint........ 137
sulphocyanate, purification from iron........ 177
tartrate, commercial, quality of........ 335
sodium sulphites, preparation and properties of........ 584
thiosulphates, preparation and properties of........ 585
Potion, Rivière's, quick method of production........ 472
Poulet, Dr On the acids of gastric and intestinal juices........ 25
Powder, sick-headache, composition........ 142
Powders, division of........385, 442, 465, 635
Processes, synthetical, in animal organism........ 197
Prochaska, O. Analysis of catarrh cure........ 10
Proteïds, estimation of, with special reference to milk........ 363
Psoralea bituminosa, medical properties of........ 349
castorea, farinaceous root of........ 346
corylifolia, medical properties of........ 352
esculenta, description, use and analysis of root........ 346
glandulosa, history of........ 349
melilotoides, description and use of root........ 350
mephitica, farinaceous root of........ 346
pentaphylla, history of........ 351
physodes, medical properties of........ 350
Pyridine, action of sodium hypobromite........ 19
Pyrodine, cautious use of........ 472
compared with acetphenyl-hydrazid........ 131
proper doses........ 136
Pyrogallol liquefied with camphor........ 136
plasters containing........ 416

Q*uakenbush, F. B.* Asclepius Cornuti and A. tuberosa........ 113
Quillaia bark not insecticide........ 177
quillajic acid from........ 142
Quinidine bromate, preparation and properties........ 121
Quinine, constitution of........ 549
recent processes for testing (chromate, bisulphate, etc.)........ 146
bromate, preparation and properties........ 119
salts, solubility increased by antipyrine........ 291
Quinoleine, action of sodium hypobromite........ 19

Ratafia of cacao, formula for........ 80

Rawlins, W. F. Leaves of Magnolia glauca ... 6
Rawson, L. G. Some new tests for tannic and gallic acids ... 181
Reider, E. S. Medicinal catechu ... 165
Remedies, new, maximal doses ... 488
Residues, estimation of, from very dilute solutions ... 532
Resin, pine, crystalline acid from ... 362
Resina guaiaci, amber colored ... 286, 316
  podophylli, assay of ... 177
Resins, chemical examination (Dieterich) ... 357
Resorcin, color reactions of (amyl nitrite) ... 566
  liquefied with camphor ... 136
  test for nitrates ... 507
    to distinguish from carbolic or salicylic acid ... 468
  ethers, action of acetyl chloride on ... 499
REVIEWS—Adrian. Étude historique sur les extraits pharmaceutiques ... 494
  Attfield, J. Chemistry, general, medical and pharmaceutical ... 590
  Atti della terza riunione d'igienisti Italiani ... 266
  Aulde, John. Writing machines for doctors ... 53
  Austen, P. T. Chemical lecture notes ... 111
  Bastin, E. T. College botany ... 267
  Beckurts, H. and B. Hirsch. Handbuch der praktischen Pharmacie, 110, 494
  Belzung, E. F. La chlorophylle et ses fonctions ... 589
      sur l' ergot du seigle ... 589
  Binet, A. Psychic life of micro-organisms ... 267
  Bouvier, E. L. Le système nerveux des crustacés décapodes ... 589
  Bowen, Cuthbert. Hand-book of materia medica, pharmacy and therapeutics ... 265
  Catching, B. H. Is the average dentist of to-day a specialist in medicine ... 54
  Cathell, D. W. Book on the physician himself ... 541
  Compendium of the laws relating to public health and safety ... 53
  Denison, Chas. The preferable climate for phthisis ... 53
  Digest of the more important publications on sulfonal-Bayer ... 54
  Dimock W., C. J. H. Ward and D. Hooper. Pharmacographia Indica .. 540
  Dohme, A. R. L. Orthosulphobenzoic acid ... 496
  Dulles, C. W. Report oh hydrophobia ... 266
  Farquharson. R. Guide to therapeutics and materia medica ... 383
  Fitting glasses ... 112
  Galinier, H. Sur la lanoline ... 588
  Grinal, E. La determination de l'astigmatism ... 543
  Heimann, J. Der Kohlensäure-Gehalt der Luft in Dorpat ... 271
  Hilger, A. Mittheilungen aus dem pharmaceutischen Institute, Erlangen ... 494
  Hirsch, B. Universal-Pharmakopöe ... 108, 542
    and H. Beckurts. Handbuch der praktischen Pharmacie ... 110, 494
  Jadin, F. Les organes sécréteurs des végétaux et la matière médicale. 588
  James, B. W. American resorts ... 270
  Jorban, N. Vergleichende Untersuchungem zum Nachweis von Arsen 384
  Klein, A. Nachweis von Blut ... 271
  Kordes, R. Vergleichung der wichtigsten narkotischen Extrakte ... 52
  Lichinger, F. Officinelle Croton- und Diosmeen Rinden ... 384
  Lindley, W. Below sea-level ... 53
  Lochman, C. L. Dose and price labels ... 112
  Maisch, H. C. C. Einwirkung von Säurchloriden auf Phenolæther ... 496
  Marty, A. P. La pharmacie à Montpellier ... 543
  Massey, G. B. Electricity in the diseases of women ... 266, 542
  McNutt, W. F. Mineral and thermal springs of California ... 53
  Merck's index for chemicals and drugs ... 268
  Merriam, C. H. The English sparrow ... 590
  Methods of analysis of cattle food, dairy products, etc ... 52
  Mixter, W. G. Elementary textbook of chemistry ... 269

REVIEWS—Newman, R. Defence of electrolysis in urethral strictures ... 267
    Failure of Dr. Thomas' treatment of urethral strictures by electrolysis ... 53
  Nevinny J. Wandtafeln zur Mikroskopie ... 638
  O'Brine, D. Laboratory guide in chemical analysis ... 268
  Pacht, Th. Verhalten der Fette zu Zuckersolutionen ... 271
  Peters, H. Pictorial history of ancient pharmacy ... 110
  Pharmacographia Indica ... 540
  Pharmacopœia, U. S., digest of criticisms ... 266
  Phenacetine-Bayer, resume of publications on ... 54
  Physician's Visiting List ... 52
  Planchon, L. Les produits de la famille des sapotées ... 542
  Proceedings of American Pharmaceutical Association ... 111
    Italian hygienists ... 266
    National Confectioners' Association ... 639
    National Wholesale Druggists' Association ... 112
  Record of experiments in manufacture of sugar from sorghum ... 270, 639
  Remington, J. P. Practice of Pharmacy ... 637
  Report (6th annual) of Agriculture experiment station (Mass.) ... 270
    (25th annual) of the Alumni Association, Philadelphia College of Pharmacy ... 540
    (2d biennial) of California State Board of Forestry ... 271
    (30th annual) of inspector of milk and vinegar ... 266
    (2d biennial) of North Carolina Board of Health ... 384
    of Pennsylvania State College ... 53, 271
    (2d annual) of State Board of Health ... 54
    (3d annual) State Board of Health ... 112
  Sadtler, S. P. Debt of medical and sanitary science to synthetic chemistry ... 267
  Schaer, E. Verbreitung chemischer Verbindungen in der Pflanzenwelt ... 543
  Smith, C. L. History of education in North Carolina ... 272
  Spencer, G. L. Manufacture of sugar by diffusion ... 590
  Symonds, B. Manual of chemistry ... 496
  The art of dispensing ... 109
  Transactions of American Association of Obstretricans and Gynecologists ... 54
      Dermatological Association ... 266
  Treitenfeld, B. A. Beiträge zur Toxikologie des Ortho- und Para-Toluidin ... 53
  Tschirch, A. Angewandte Pflanzenanatomie ... 107
  Tucker, W. G. Report to New York Board of Health ... 589
  Vasey, Geo. Report of the botanist for 1888 ... 591
  Von Frey, E. Kohlensäure-Gehalt der Luft in und bei Dorpat ... 384
  Wade, D. W. C. A new antiseptic ... 53
    Displacement of the uterus ... 53
  Warner's therapeutic and reference book ... 270
  Wilbuschewicz, E. Untersuchungen der Amerikanischen und Java-Chinarinden ... 496
  Wiley, H. W. Food and food adulterations ... 590, 638
  Witherstine, C. S. International pocket medical formulary ... 269
  Year-book of pharmacy ... 111
  Zusammenstellung der Arbeiten über das Antipyrin ... 54
Rewards for discoveries and inventions ... 51
Reychler, A. Artificial diastase ... 432
Rhammus caroliniana, use of ... 554
  Frangula in odontalgia ... 16
  Purshiana, admission into the pharmacopœia ... 553
    extracts and tasteless extracts ... 184
Rhododendron species containing andromedotoxin ... 360
Rhubarb, assay of (Drescher) ... 339
Rhus aromatica, in incontinence of urine ... 189

Richardson, Clifford. Analysis of root of Psoralea esculenta...... 347
Ricinus seed, poisonous principle of...... 610
Rogers, F. A. Preparation of drug sections for microscopical examination.. 42
Rubber as basis for plasters...... 416
  tubing, hardening and disinfecting of...... 22
  vulcanized, action of glycerin...... 287
Rubus villosus, analysis of root bark (Krauss)...... 605
Rumex hymenosepalum, canaigre, use for tanning...... 395
Rust stains, removal of...... 76

Saccharin, commercial, constituents of...... 496
  reaction with potassa...... 613
Sadtler, S. P. Recent improvements in methods of manufacture of chloroform...... 321
    Synthesis of alkaloids...... 545
Saffron, adulterations of......261, 607
Saliva, chemistry of...... 569
Salmon, E. F. Senna pods...... 581
Salol liquefied with camphor...... 136
  use in dysentery and diarrhœa...... 410
Sandalwood of Australia, Myoporum...... 623
Sassafras Goesianum, bark, description of...... 38
Schlagdenhauffen, Fr. and *E. Heckel.* The root of Vernonia nigritiana...... 40
Schrenk, Jos. Insect flowers...... 295
Schroeter, H. J. M. An old sample of camphor oil...... 333
    Examination of chlorinated lime...... 13
    On the composition of hydrangin...... 117
    and *H. Trimble.* Crystalline compounds in Fabiana imbricata...... 407
      Oil of camphor...... 273
      Oils of wintergreen and birch...... 398
Schwacke, C. A. Household ammonia...... 335
Schwicker, H. Sulphites and thiosulphates...... 584
Scutellaria lateriflora, constituents of...... 555, 587
Sealing wax, indifferent to alcohol...... 178
Sebelien, J. Estimation of proteids, with special reference to milk...... 363
Secret remedies, prohibition of sale of...... 588
Senega, false, in the market...... 105
  root, false, origin of......381, 439
    test for indentification and age (Reuter)...... 413
Senna, market supply of...... 189
  pods, medical properties and constituents of...... 581
Serem lactis sinapinum, formula...... 126
Sesamum, cultivation in China...... 143
Shkateloff, V. Composition of resin from Pinus silvestris...... 132, 367
Silver nitrate as tests for fixed oils (Moerk)...... 65
  thiosulphates, double salts...... 586
Sjöqvist, J. Estimation of hydrochloric acid in contents of stomach...... 251
Skin diseases, Unna's topical applications...... 17
  preparations for the...... 443
Smith, A. P. Estimation of diastase in malt extract...... 482
Smith, Geo. Dilution of cow's milk in infant feeding...... 424
Soap, native Wyoming, a silicious mineral...... 613
  petroleum, formula and preparation...... 287
Soap-root used in Egypt...... 188
Solanum carolinense, medical properties of...... 552
Söldner, F. Salts of milk and their relation to caseïn...... 476
Solutions, dilute, estimation of solid residues from...... 532
  pharmacopœial one per cent., Br. P...... 535
Somnal, preparation and properties of...... 564
Sodium benzoate and caffeine in fruit syrups incompatible...... 288
  bicarbonate, commercial, quality of...... 336
    detection of thiosulphate in...... 608

- Sodium bicarbonate, process of English manufacture...... 248
  - borate and cocaine, incompatibility of...... 18
  - boroglyceride, preparation...... 130
  - carbonate, commercial, quality of...... 336
    - estimation of, in presence of hydrate...... 353
  - chloride, effect upon mercurous chloride...... 123
  - dithio-salicylate, dose and effect...... 411
    - medical properties of...... 560
  - hydrate, containing nitrate...... 78
  - hypobromite, action upon certain aromatic derivatives...... 19
  - hypophosphite, determination of purity (Mœrk)...... 392
  - nitrite, manufacture of...... 618
  - potassium sulphites, preparation and properties of...... 584
    - thiosulphates, preparation and properties of...... 585
  - salicylate for sick headache...... 142
    - impurity in (salicylic acid)...... 536
    - incompatibility with dry antipyrine...... 288
    - solution, stability of...... 250
  - sulphide, manufacture of...... 617
  - thiosulphate, action of acids on......524, 583
    - detection of, in bicarbonate...... 608
- Sozoiodol, preparations of, strength and uses...... 17
- *Spear, O.* Analysis of toilet powder...... 11
- Specimens, anatomical, preservation of colored...... 245
- *Spica, P.* Diosmin...... 86
- Spiritus sinapis, Phar. Germ...... 127
- Sponges, antiseptic, preparation......21, 473
- *Stadelmann, E.* Pepsin in normal and pathological urine...... 365
- Stains, ink and rust, solution for removal...... 76
- Starch, determination of, by barium hydrate...... 355
  - iodide, as a disinfectant...... 423
- Starches, new medium for mounting...... 171
- State Pharmaceutical Associations:
  - Alabama...... 376
  - Arkansas...... 377
  - Connecticut......222, 377
  - Delaware...... 377
  - Florida...... 317
  - Georgia...... 537, 591
  - Illinois......50, 537
  - Indiana...... 537
  - Indiana...... 537
  - Iowa...... 537, 638
  - Kansas......377, 539
  - Kentucky......377, 539
  - Louisiana......317
  - Massachusetts......50, 537
  - Michigan......263
  - Minnesota......50, 538, 591
  - Missouri......50, 538
  - Nebraska......378, 591
  - New Hampshire...... 263
  - New Jersey...... 318, 591, 638
  - New York......223, 538, 638
  - North Carolina......263, 538
  - North Dakota...... 538
  - Ohio......378, 539, 591
  - Pennsylvania...... 223, 378
  - South Dakota......50, 539
  - Tennessee...... 318
  - Texas......380, 638
  - Virginia...... 539
  - Wisconsin...... 50, 539
- *Stefan, J.* Diffusion of acids and bases into one another...... 615
- *Stengelin, W.* Unguentum aquæ rosæ...... 128
- *Sticker, G.* Chemistry of saliva...... 569
- Stigmata maydis, determination of sugar...... 70
- St. Louis College of Pharmacy......222, 317, 376
- Strophantin, properties and preparation...... 85
  - toxic power of...... 18
- Strophanthus, chemistry of (Frazer)...... 532
  - diuretic principle...... 137
  - seeds of different species...... 532
  - glaber, active principle of...... 469
- Strychnine, character compared with exalgin...... 417
  - in vermin killers...... 532
  - quantitative separation from brucine...... 180

Strychnine hypophosphite, properties of........ 530
Styrax bark, use in Egypt........ 188
Sugar, solubility in water........ 563
Sugartree of Australia, Myoporum........ 623
Sulfonal, preparation........ 178
    doses of........ 243
    test for (reduced iron)........ 563
Suppositories, glycerin, formulæ........ 79
    use of lanolin in........ 80
Syrup, Easton's, proper amount of sugar for........ 528
Syrups, acid fruit, incompatibility with caffeine and benzoate of sodium........ 288
Syrupus, acidi hydriodici, permanent, preparation of (glucose)........ 14, 49
    croci, various formulas for........ 96
    dextrini, use in pharmacy........ 439
    ferri iodidi, preparation (Zelinka)........ 78
        stability of........ 440
    rhei aromaticus, addition of borax........ 128
    rubi idæi, distinction of genuine........ 179
    simplex, amount of sugar in........ 335
    sinapis, formula........ 127
    tolu with potassium iodide, cause of yellow tint........ 137

Tallow, iodine number........ 179
Tanghinin, production and properties........ 472
Tannin, physiology of........ 567
Tannin-red, properties of........ 310
Tar, commercial, manufacture of........ 600
        properties of........ 106
        refined, preparation and properties of (Lowe)........ 234, 260
    pyrocatechin in........ 601, 634
Tartar emetic, aqueous solution, action of alcohol on........ 31
            rotation of........ 31
        commercial, examination of........ 32
        pharmacopœial requirements for........ 27
        volumetric estimation of antimony in........ 28
Teeth-cleanser, preparation........ 411
Test paper, electrode, preparation........ 131
        blue litmus, preparation of sensitive........ 245
Theine, used hypodermically........ 244
Thiocamf, a new disinfectant........ 468
Thiol, substitute for ichthyol........ 76
Thiosulphates, action of acids on........ 524, 583
    double salts........ 584
Thompson, C. J. S. Note on syrupus croci........ 96
Thymol, color reaction (amyl nitrite)........ 566
    determination of thymene in........ 375
    iodine derivative, substitute for iodoform........ 609
    liquefied with camphor........ 136
    reaction of, with iodine........ 179
Tin, atomic weight........ 22
Tinctura aloes, identification of........ 505
    boleti laricis, precipitate of........ 443
    calumbæ, identification of........ 505
    cantharidis, preparation........ 241
    catechu composita, percolation of powder........ 241
    cinchonæ, identification of........ 505
    colchici, identification of........ 505
    digitalis, identification of........ 505
    ferri chloridi, impurities in........ 123
            use of water to replace alcohol........ 241

Tinctura gelsemii, identification of........ 505
  gentianæ comp., preparation........ 467
  guaiaci, identification of........ 505
  iodi, cure for warts........ 487
  ipecacuanhæ, identification of........ 505
  jalapæ, identification of........ 506
  kino, cause of gelatinization........ 633
    menstruum for........ 71
    preparation........ 71
    time of maceration 241
  limonis, preparation with grated peel........ 535
  nucis vomicæ, examination........ 241
      identification of........ 506
  opii, examination 241
  opii, quality of........ 337
  camphorata, assay of........ 338
  opii deodorata, modification of process........ 242
  psoraleæ composita, preparation........ 351
  quebracho, identification of........ 506
  quillajæ, American, preparation........ 138
  scillæ, prevention of precipitate........ 242
  sennæ, an inefficient preparation........ 526
  sinapis, preparation and uses 124, 158
  strophanthi, preparation of (Beringer)........ 454
  vanillæ, powdering vanilla for........ 242
Toilet powder, invisible, composition of........ 11
    Recamier, composition of........ 99
Toluidine, action of sodium hypobromite........ 19
Toothache drops, formula for 286
Toothpaste containing hydrogen peroxide........ 411
Toothwash, disinfectant, formula for........ 612
Tragacanth, composition of........ 427
  soluble gum of 72, 106
Traube, M. Hydrogen peroxide from persulphuric acid........ 620
Trimble, H. Canaigre........ 395
    Some Indian food plants 4, 556
    and *H. J. M. Schroeter.* Crystalline compound in Fabiana imbricata 407
        Oil of camphor........ 273
        Oils of wintergreen and birch........ 398
        Old sample of camphor oil........ 333
Turpentine, Russian, crystalline acid from........132, 362

Ulmin, properties of........ 310
Umney, J. C. Congealing point of anise oil........ 255
Unguentum aquæ rosæ, formula (Stengelin)........ 128
  hydrargyri, colored with Prussian blue........ 337
    preparation with lanolin........ 247
    process of assay (Dieterich, Kremel)........ 290
    rapid preparation with amalgams........ 466
    with glycerite of starch requires lanolin........ 287
  iodi, bases for........ 128
  naphtholi, strength and uses of........ 16
  picis, use of wax for........106, 634
  potassii iodidi, inalterable (glycerin)........ 79
  zinci with mucilage of tragacanth........ 561
Uralium, hypnotic properties........416, 471
Urea, simple apparatus for determining........ 439
Urine, detection of acetone in........ 175

Urine, effect of coffee ... 141
  estimation of albumin (Zahor) ... 24
  pepsin in normal and pathological ... 365
Uva ursi, free from andromedotoxin ... 361

Valerian, odorless preparation of ... 417
Valerianic ether, medical properties and administration of ... 521
Valser and *Granval.* Falsification of oleic acid ... 475
Vanilla, detection of benzoic acid on ... 20
Varnish, phenolated pyroxylin, for surgical dressings ... 559
Vaubel, W. Behavior of sodium thiosulphate with acids ... 583
Veratrum alkaloids, estimation of ... 290
Vermillionette, preparation of ... 17
Vernonia nigritiana, properties, etc. of root ... 40
Villosin from blackberry bark ... 606
Vinum ipecacuanhæ, assay of ... 529
  sinapios, formula ... 126

W*agaman, S. A.* Granules of morphine sulphate ... 336
Wall paper containing arsenic ... 438
Warden, C. J. H. Erythroxylon Coca grown in India ... 358
Warren, T. T. P. B. Walnut oil ... 419
Warts, removal by carbolic acid ... 85
    by iodine ... 487
Water, solubility of lead in ... 531
  aerated, nitrous impurity in, effects of ... 529
  seltzer, local anæsthesia with ... 613
Waters, bitter, natural and artificial ... 443
Wax, bees, adulteration with paraffin, detection of ... 564
  powdered, preparation and use of ... 294
  yellow, adulterated with paraffin ... 337
Westphal, C. H. Native Wyoming soap ... 613
Wheat, embryo as food ... 361
Wiegand, Thos. S. On the dispensing of powders for prescriptions ... 385
Wiernik, T. and *G. Lunge.* Specific gravities of ammonia solutions ... 516
Wild cherry bark, preparation of, amount of hydrocyanic acid ... 534
Wilder, H. M. Cleaning of mortars and graduates ... 236
    Division of powders ... 465
Williams, W. L., and *Prof. Dunstan.* Metameric amyl nitrites ... 148
Wilson, J. A. Cottonseed oil and beef fat in lard ... 195
Wine, raisin, formula for ... 245
Witherow, J. H. Pill excipient ... 466
Wood, H. S. Glacial acetic acid ... 335
Wool fat (see Lanolin).
Woolley, E. J. and *Prof. Dunstan.* Chemical constituents of amylnitrite. 153
Wyoming soap, native, a silicious mineral ... 613

Yaraque, preparation from cassava ... 80

Z*ahor.* Densimetric estimation of albumin in urine ... 24
Zinc cyanide, in affections of the heart ... 97
  oleate, preparation of ... 595
  oxide, plasters containing ... 416
  salicylate, rapid preparation ... 180
  sulphide, use of, in eczema ... 609
Zygadenus elegans, a loco weed ... 409
  Nuttallii, poisonous effects of plant ... 410
  venenosus, death camass of Indians ... 410
Zygophyllum coccineum, fruit, use by the Arabs ... 189
  simplex, leaves, use in eye diseases ... 189

SMITHSONIAN INSTITUTION LIBRARIES
3 9088 00872 9279